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Towards a transatlantic consensus on climate change

High-Level Transatlantic Dialogue on Climate Change

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PREFACE

Alexander Ochs, SWP

The High-Level Transatlantic Dialogue on Climate Change was organized jointly by the Brookings Institution and the German Institute for International and Security Affairs (SWP), and sponsored by the German Marshall Fund of the United States (GMF). The workshop took place at the Villa Vigoni in Lovenjo Menaggio, Lake Como, Italy, on October 16-18, 2003. The event was part of the project INTACT – International Network To Advance Climate Talks, begun by the SWP at the beginning of 2002. From its inception, INTACT has been supported by a generous grant from the GMF. This particular event was also supported by the Italian Government and was only made possible by the devoted assistance of Professor Venturelli and his staff at the Villa Vigoni.

The SWP and the Brookings Institution convened this informal, high-level policy dialogue to bring together public and private sector leaders from both sides of the Atlantic, in an attempt to bridge the transatlantic divide in an issue area which may prove to be one of the biggest environmental, economic and energy security challenges of the 21st century. Participants included political leaders, policy-makers, business executives and leading experts on climate and energy policy as well as transatlantic relations.

We opened the workshop with a session on Transatlantic Foreign Policy and Climate Change and closed with a Review of Recent Action in EU and US Climate Policy followed by a discussion of The Future of Climate Cooperation. In the additional four sessions, the Villa Vigoni dialogue introduced for the first time draft papers from four working groups which had been established earlier in 2003. Each working group is co-chaired by an American and a European, and the working group on Developing Countries by a third chair from India. These leading experts had been asked to produce brief, concise policy-recommendation papers synthesizing their prevailing knowledge on

those particular aspects of transatlantic climate cooperation which were found to be most important and most promising with regards to making substantial progress. The papers also include a variety of suggestions for possible political action. The quality of the studies provoked excellent discussion in the forum. In the afternoon of October 18, outside the official conference program, we were invited to an exchange with British and German parliamentarians at the Konrad Adenauer Foundation in Cadenabbia. This meeting of more than ten foreign policy makers demonstrated the deep interest in the topic of non-climate experts.

In addition to the working group papers and all relevant workshop material, this volume assembles the major presentations as well as a rapporteur's report summarizing the major points of discussion.

Though the workshop organizers sought advances towards realistic solutions rather than final agreement, it was remarkable to observe the level of consensus among this diverse group. As one participant wrote afterwards, he "was struck by how little tendency there was to get into the transatlantic trenches; and by the degree of consensus on crucial pointers for the way ahead." He continues: "[T]here seemed to me to be a shared sense that we need to build political will along with policy options. No one contested the importance of pulling together a wider constituency of debate, linking climate change to other concerns especially in the area of foreign and security policy. Likewise, the idea that regulation and technology policies should go hand in hand, and be designed together to be mutually reinforcing, took us helpfully beyond the widespread tendency to treat them as alternatives."

The SWP and Brookings Institution are indebted to the Villa Vigoni for hosting the meeting and our sponsors for their generous support. The organizers would like to thank all participants for their profound involvement in this dialogue, whose success raised the willingness of all participants to continue with this promising enterprise.





KEY-NOTE ADDRESSES

This is for me an important occasion to meet old friends and seniors in the field of climate change policy: I think that many of them already know what I am going to say, as I can imagine what they will say about some topics. In any case I think this is a good chance outside institutional buildings to have a frank exchange of ideas on this very critical issue from an environmental point of view, but also from a political point of view.

I want to underline, first of all, that I will not speak on behalf of the European Union. I will give some information about Italy's point of view on this issue, and I will also offer some provocative suggestions for discussion.

The Italian presidency of the European Union is trying to promote concrete discussion and fruitful work following the conclusions of Johannesburg's Summit on Sustainable Development mainly in the direction of the integration of the environmental dimension into development strategies. Three or four days ago I was in Florence on the occasion of the annual meeting of the European Environmental Advisors to illustrate the need for integration of the environmental dimension into sectorial policies. I said that we have a very clear example of this need in Italy, where there is a very clean production of energy: we do not have nuclear power, 8 or 9% comes from coal, 35% from natural gas, and 18% from renewable sources. Moreover the use of oil is limited to low sulphur content oils. We have a very clean production of electricity, but also many difficulties in building new plants for electricity production. The blackout that spread all over Italy is of recent memory: we suffered and we suffer from blackout, our production of electricity is insufficient and at the same time we need environmental consent. *Integration* is the key word: in this case, integration of the environmental dimension in the energy dimension. But I can mention many other examples of lack of integration. For instance, the air pollution in our cities is very high and very difficult to manage: this is the consequence of lack of integration between policy in the transporta-

tion sector and environmental protection policy. We have also to find an answer to the need to integrate the private sector in environmental policies, not forgetting that Johannesburg's Summit on Sustainable Development recognized the role of private companies and of the business community in order to combine economic growth and environmental protection. We are committed to go down this path and we intend to accelerate and qualify the change of attitude in Europe. What we want and what we are working for is to move from the ideology of controlling culture and policies to a positive approach to the environment as a driving force for development and economic growth. And a climate change policy is today the best test case to consider such a transformation.

We know very well that the third assessment report on climate change from IPCC suggests that, no later than 2025-2030, carbon dioxide emissions must be reduced by at least 50%, compared with '90 levels. A much broader strategy and much more effective measures than those within the Kyoto protocol are needed, but also an extraordinary effort in terms of research and innovation to reduce carbon intensity on the economy, to make new, clean and safe resources of energy available and cost effective and, at the same time, to promote the supply diversification related to fossil fuels and finally a commitment by all countries, both developed and developing, to decrease emissions and ensure a stabilization of CO₂ concentration in the atmosphere.

In this perspective the Kyoto protocol (and this is our view, the Italian view) represents a first step to test the feasibility of an international mechanism, based on global targets, national regulations and market instruments. We consider the Kyoto protocol as an interesting instrument, but after considering all the regulations, all the targets, all the marketing instruments, we wonder if the Kyoto protocol is an interesting instrument for addressing the climate change issue. In our opinion, European climate change policies have a contradictory attitude with respect to the Kyoto protocol. The European climate change programme is a cross-sectorial package of policies and measures to meet the Kyoto targets involving the energy industry, transport and

housing sectors, and based both on regulations and voluntary agreements. It is a very interesting document, but nevertheless the first step in the implementation of this programme is mainly based on a common and controlled approach.

The directive on emission trading, despite the market mechanism reference, is more focused on mandatory targets than on market mechanisms, and particularly the restrictions in the use of joint implementation in a clean development mechanism are a limited interpretation of the protocol and do not facilitate a global response from European companies to the global challenge on climate change. This is our opinion. I would like to make it clearer.

The Italian presidency organised a joint meeting of Environmental and Energy Ministers from 30 European countries in Montecatini last July, to discuss how to integrate strategies and policies to meet both energy security and the Kyoto targets. This discussion was very interesting: it was the first discussion we had in Europe after '90, when I remember – during the Italian presidency – we had a joint meeting of the Ministers for the Environment and Energy and on that occasion we agreed on the first commitment of the European Union to re-reduce our gas emissions. But after that we had no further occasion to meet until Montecatini.

This discussion was very interesting, because we had the opportunity to consider the climate change issue from different points of view. I realized it was also in many cases the first occasion for a discussion between Ministers for the Environment and Energy from the same country. The Ministers agreed, in general, on several points: that climate change is a global challenge and requires a comprehensive global response; that European climate change and energy policies should be integrated in a single vision and market-based instruments are necessary for promoting winning strategies in the domestic and international markets; that the exploitation of international cooperation by using the full potential of the Kyoto mechanism is a key-factor in promoting the worldwide commitment to sustainable development, in order to enhance research and development and to disseminate

clean and efficient technologies. This is an interesting vision of the Kyoto mechanism, in my opinion. The Ministers also agreed that climate change policies should not affect the competitiveness of European industry and economic growth; they also underlined that an active partnership with Russia for the development and the dissemination of high efficiency and low emission energy technology is urgent, also considering that Russia is setting to increase its role as the principal future energy supplier to the European Union.

Regarding this point, we had and we have a discussion inside the European Union about the role of Russia and about the approach we have to use with Russia. If we consider Russia only from the point of view of its role, its essential role in the coming into force of the Kyoto protocol, we may not understand the complex role of Russia today. If we consider Russia, as president Putin said in Moscow on 29th September, when opening the World Climate Conference, as the main reservoir of natural resources for all Europe and also the main energy supplier for the European Union, maybe we will meet the demand of Russia and maybe we will also be able to facilitate the coming into force of the Kyoto protocol. This is Italy's opinion, which is not the same as the general opinion within the European Union.

The Ministers also agreed that cooperation with the USA is of strategic importance in order to develop low carbon technologies and low emission energy technologies to address the challenge of the stabilization of CO₂ concentrations.

In conclusion, I would say that the joint Environmental and Energy Meeting seeks a new approach in European policies, based on integration and on mutually supporting objectives. And I think that this is a critical point in European Union policies, because the need to change approach is quite clear to us, but at the same time we have different and parallel tracks and these tracks are driving sectorial policies in a different way, not in the direction of integration, but in the direction of divergence. If we see the figures relative to CO₂ emissions in Europe and the future scenario of CO₂ emissions, it is easy to realize that we have no convergence between the policies in order to meet the

Kyoto targets: this is the reality and if we do not bear it in mind, we may continue to work for a future that is not so real, not only in the short term but also in the medium term.

I now want to introduce another point for discussion. We have started an interesting cooperation programme with the USA on technological and scientific issues related to climate change. In our opinion, scientific and technological cooperation may play a relevant role in the future of international climate change policies, mainly considering the role of technology in the future of such policies. And we had the opportunity of COP9 in Milan to test a possible way of approaching the climate change issue within the framework of the Climate Change Convention, not only within that of the Kyoto protocol. Of course we hope we will be able to exploit the occasion of COP9 to facilitate the coming into force and the implementation of the Kyoto protocol, but the result depends mainly on the approach of the European Union to Russia. If we do not decide which approach to use, it may be very difficult. We are working in this direction: for the next meeting between the European Union and Russia, which will be held in Rome 4th November next, the Kyoto protocol issue is on the agenda.

Moreover, it is now necessary, in our opinion, for COP9 to point the way beyond the protocol in order to meet the challenge in terms of objectives on emission reduction, necessary for the stabilization of carbon dioxide concentration in the atmosphere.

I think that we will not find many problems between us, between the developed countries and also between developed countries including the USA and the main newly-industrialized countries. We will not have problems, because in general we agree that we have to work beyond the Kyoto protocol. As for COP9, as for the future beyond the Kyoto protocol, as for the role of the convention, I think that we have to use the convention, the framework of the convention, to build a new partnership between Europe and the USA, focused on technological cooperation and on the identification of ways and of mechanisms to meet the further emission reductions beyond the Kyoto protocol.

At the same time, we have to reach agreements with the emerging economies and the newly-industrialized countries about technology, the development of technologies and the exchange of technologies in order to facilitate the sharing after 2012 of common standards and common objectives in energy efficiency and emissions. We do not have to open the discussion in COP9 or after COP9 on the mandatory targets for developing countries and newly- industrialized countries, but we have to work, to agree on common standards for the technologies we will use in the global energy market. There is the very positive and effective experience of cooperation with China to consider. We established a programme, a joint programme with China in 2000: at the moment we are developing 15 projects, mainly oriented towards protection and conservation of national resources, energy efficiency, reduction of emissions, protection of air quality. In my experience, the request from the Chinese government is based on the best available technologies and I think that it could be the common framework to enhance a new role for developing countries and newly-industrialized countries in the context of the convention.

As for COP9 we would like to avoid, if possible, procedural discussions. We would like to avoid long exhausting discussions about declarations: in the last meeting for the preparation of COP9, the Minister from Germany, Jürgen Trittin, was asked and agreed to avoid any declaration, so as not to waste time in negotiations about wording. We would like to use COP9 to facilitate the exchange of experiences, the exchange of visions and maybe, if it is possible, the presentation of projects in order to build the basis, the framework for the next co-operation beyond the Kyoto protocol.

I know very well that this vision of the situation, the interpretation of European policies at this stage of the implementation of the European Climate Change programme is the point of view of Italy, the point of view of one of the countries of the European Union. But I would like to recall, in conclusion, the letter sent by Chancellor Schroeder, Premier Tony Blair and President Chirac to President Prodi about chemicals two or three weeks ago. They asked him to consider

– in preparation of the new proposals for the regulation of chemicals – the competitiveness of European companies; in particular they asked him to avoid establishing in Europe a set of regulations which would affect the competitiveness of European companies, without forgetting to take into account the necessity of protecting the environment, of course.

I think that we could use the same approach for the implementation of the Kyoto protocol in Europe, if Europe implements the Kyoto protocol on a unilateral basis.

This is the point, because I doubt that Russia will ratify the Kyoto protocol. This is a challenge for the European Union, because we have to sustain the role and message of the Kyoto protocol, but at the same time we cannot imagine that the Kyoto protocol will be a regulation applied exclusively by the European Union.

All possible efforts must be made to promote dialogue on climate change between the EU and the US. Regardless of what attitude we may have with regard to the Kyoto Protocol, a constructive dialogue between the EU and the US is very much needed. The climate problem cannot be effectively tackled without the US, and we must do everything possible to define areas where cooperation is possible.

Before discussing the prerequisites for a dialogue between the EU and the US, let me first suggest that we ought to rethink the terminology used. As US environmentalist Paul Hawken has put it, "One of the problems with global warming is that it is a misnomer. It is global climatic instability.... It is not that everything is going to be hot and humid – it is going to be more volatile." So instead of referring to "global warming" we should talk about "global climatic instability". This is not yet fully understood by the general public and policymakers. Let me revert to this particular aspect a bit later on.

Many Europeans were shocked by President Bush's declaration in March 2001 to not ratify the Kyoto Protocol. The concern has grown in the time that has passed for the simple reason that no real alternative to Kyoto has been presented. The President's energy bill is totally inadequate if the goal is to curb carbon emissions. Moreover, the bill is very much different from the energy policies pursued in the EU. Our approach gives priority to DSM (demand-side management), i.e., to energy efficiency in all its dimensions, and to renewables. The US energy bill, on the other hand, focuses most of its attention to the securing of new sources of fossil fuels, through imports but also through exploration in places like Alaska. To be fair, efforts are also made to increase R&D in new technology, mainly hydrogen, and to encourage energy efficiency. But the main priority is to secure an increasing flow of fossil fuels into the US market. I do recall the words by George Bush Sr. in Rio: "The American lifestyle is not negotiable". It is obvious that George Bush Jr. has adopted the same attitude.

Before commenting specifically on the prerequisites for the re-

sumption of a real dialogue between the EU and the US on climate change, let me reflect for a moment on the main reasons for the huge differences that do exist in policymaking on this issue between the EU and the US.

One reason for the differences, no doubt, has to do with the close connections that do exist between Mr. Bush and the energy-intensive industry. Many US companies have been in strong opposition to Kyoto and there has been considerable lobbying going on in Congress and elsewhere to try to marginalise environmentalists and to portray the Kyoto Protocol as a disaster for the US economy. Given all the money Mr. Bush received from industry, notably the oil and coal industries, it is perhaps not surprising that he is taking the position of rejecting Kyoto.

To be fair, however, opposition to Kyoto started before Bush came into office. I am sorry to say that Mr. Clinton did little to promote Kyoto on the national scene while in office. This shows that opposition to Kyoto is more widely spread. The question is why.

One possible reason has to do with the way the climate problem is perceived. In Europe we have suffered from quite a number of extreme weather events in recent years – floods as well as heat spells and droughts. This, no doubt, has made many people start to realise that a changing climate may be both unpleasant and difficult to deal with. Moreover, there is increasing recognition that climate change may not be gradual; rather, the climate could flip suddenly and result in quite dramatic consequences. One such event could be the collapse or slowing down of the thermohaline circulation. Such abrupt change would be disastrous for parts of Northern Europe, not the least of which Scandinavia, where I come from.

An increased frequency of extreme weather systems - like the ones we have experienced in recent years – are difficult enough to adapt to, but possible to handle. But abrupt change – like the slowing down of the Gulf Stream or the drying up of the Amazon Basin, is something totally different. If such events would happen gradually, let us say over hundreds of years, they would be difficult, but possible to handle. But

if such changes happen more or less overnight, the consequences would be dramatic. If the Gulf Stream slows down, Scandinavia would become like Siberia. The repercussions for society would be enormous. This, by the way, is the reason why I suggest that we discuss climate change under the heading of “climatic instability” rather than “global warming”.

The US administration and those supporting their views, on the other hand, seem to perceive climate change – if they believe in it at all – as a linear problem. If there is change, so goes the thinking, it is gradual and we have time to “wait and see”. But as many scientists have emphasised, the climate system is not subject to linearity, and history is full of examples of abrupt changes in the climate system.

Yet another reason for the differences of opinion is related to the perception of costs. In the EU, considerable efforts have been made to estimate the costs of curbing emissions. If emissions reductions are carried out in a cost-effective way, i.e., by using emissions trading as one of the key instruments, the EU study tells us that as much as 16% of EU GHG emissions – that is to say, well above our Kyoto target of 8% reductions by 2010 – can be reduced for a cost that is lower than US\$20/ton CO₂. More specifically, to achieve the Kyoto objectives would lead to an extra cost per year of roughly 3.7 billion Euro, equivalent to 11 Euros per citizen per year. Hardly a big sacrifice!

In the US, on the other hand, the message from the administration is that to comply with Kyoto would be the same as “the ruin for the US economy”. This message is very difficult for the Europeans to understand and accept, in particular since the US economy is much less energy-efficient than ours. The US uses almost double the amount of energy per economic output compared with EU-15. If we were to compare with Japan, the contrast would be even stronger. Given this background, there ought to be a lot of “low-hanging fruit” in terms of energy savings for the US to capture. As a matter of fact, the cost to meet the Kyoto targets should be even lower than in Europe, at least for the first 5-10% of emissions reductions.

I realise that cost estimates do vary a lot depending on the metho-

dology used. Top-down macro-economic modelling tends to result in higher costs. Bottom-up cost analysis of new options on a project basis, on the other hand, tend to give significantly lower cost estimates. But even if we take such things into account, it is hard to understand that perceptions of costs vary to such a large degree on different sides of the Atlantic!

My comments so far in terms of costs are based primarily on studies carried out within the EU. However, the general conclusions drawn in Europe regarding the costs for society to reduce carbon emissions are very similar to those reached in several international as well as American studies. One interesting study is by the World Energy Assessment (WEA) – presented in 2000 jointly by UNDP and the WEC (World Energy Council). The study includes three different scenarios. The so-called ecology driven scenario projects a 40% lower primary energy demand for 2050, more or less the same level of economic growth and 25% lower investments in energy supply as compared to the base scenario (business as usual).

Another important study was presented recently by the PEW Centre on Global Climate Change. PEW has analysed different energy projections for the year 2035 and their implications for GHG emissions, for economic growth and for the cost of emission reductions.

One key message from the PEW Centre Study is that voluntary action, which is the policy proposed by Mr. Bush, will not work if the goal is to reduce carbon emissions. Even though the carbon intensity will be reduced in the case of voluntary action, the overall growth in the economy will mean that US carbon emissions will continue to rise. Only a mandatory climate policy, with a cap put on emissions, can change that. The other key message is that a policy aimed at reducing emissions – in this case an estimated 38% reduction in 2035 compared to the year 2000 – will have a negligible impact on economic growth. The growth rate in 2035 is estimated to be 0.5-1% lower than in the base scenario. However, energy expenditure would be significantly lower, which means that consumers would be better off. Another important effect would be that of the drastically lower pollu-

tion levels, which would be positive for health, and quality of air, water and soils.

Allow me a final comment on the whole problem of costs and benefits of emissions reductions. I have come across quite a number of people in the US recently who seem to believe that ever increasing flows of energy and raw materials through society is something fundamentally positive for the US economy. Such people are obsessed by quantitative growth figures. No doubt, you will find the same kind of sentiments in Europe as well. But we have had years of debate by now in relation to our work on sustainable development strategies, where one central objective has been to try to make energy and material use much more efficient. I refer to the debate on Factor 4 and Factor 10.

Yet another reason for opposition in the US to Kyoto is the fact that developing countries so far are not obliged to undertake emissions reductions. Their share of emissions will increase rapidly and the feeling in the administration seems to be that the whole climate regime will be ineffective as long as developing countries are left outside the formal framework of emissions reductions.

I can understand such sentiments. But we have to recognise that many developing countries already have done quite a lot in recent years to promote energy efficiency and invest in alternatives to carbon:

- Brazil's ethanol programme is one example.
- China's huge improvements as regards energy efficiency is another.

Besides, what the Bush administration forgets is the agreement reached early on within the Climate Convention that industrialised countries would have to take the lead when it comes to emissions reductions. After all, it is our emissions that, during the build-up of our economies, have put us in the serious situation we are in. But the expectation, no doubt, is that sooner or later developing countries will join and be obliged to emissions reduction targets as well. If we want to encourage such reductions now, we have to provide finances for the

incremental cost involved. So far such mechanisms have been few and far between. We have the GEF (Global Environment Facility), but its contribution to green energy in developing countries has been limited – an estimated US\$250 million per year over the last ten years. That amount should be compared with what developing countries invest yearly in new energy production – an estimated US\$125-150 billion!

There are of course other arguments at play when trying to explain the US rejection of the Kyoto Protocol. But I believe the ones I have listed are the major ones. I might add yet another argument: a general mistrust of multilateral agreements, notably within the Bush administration. This particular argument has not been put forward in relation to Kyoto, but it is probably in the background for quite a number of the neo-conservatives. Such an attitude, by the way, is a drastic departure from previous US policies with regard to multilateral cooperation.

Now, how can we overcome opposition towards emissions reduction in general and the Kyoto Protocol more specifically?

First, we ought to realise that the Bush administration does not represent all Americans in their views on climate. There is opposition in Congress – notably from senators McCain and Lieberman. They have tabled a motion requiring that the US decides upon specific emissions reduction targets for the year 2016. Their proposal is not as ambitious as Kyoto, but the approach is similar to Kyoto and would represent a welcome step. There is opposition as well at State level – a lot of initiatives have been taken recently to curb emissions and promote clean technology. There is a lot of opposition within the scientific community and there is opposition among many private-sector companies. Finally, there is growing opposition among many citizens.

So we have to look for constructive dialogue, not only with the administration but with all possible stakeholders in the US.

Second, we have to convey more systematically and in plain language the importance of this issue for the EU. The climate issue should be on the agenda whenever European leaders meet with their American counterparts. I want to stress one point: Climate is not only a priority for those in Europe or in the US dealing specifically with en-

vironment issues. It must be seen as an important issue for the Transatlantic Dialogue as such and hence be a priority also for foreign policy experts.

Third, we have to explain in detail what we are doing in Europe to curb emissions. This is important for at least two reasons:

- I. The sharing of best practices – i.e., what works and what does not work, including the costs involved – will hopefully help Americans realise that there are effective ways to curb emissions and that the US way of addressing energy issues is not the only one possible! Having lived in the US, I know that most Americans know little about the world outside the US and that many of them think that the American way is the best possible to organise society.
- II. The other reason is that there seems to be a widespread perception in the US – not the least among members of Congress – that we Europeans mainly talk but that we are poor when it comes to action. Such feelings are to some extent understandable, because based on present policies and measures, the EU as a whole will have difficulties meeting the Kyoto targets. The European Environment Agency came out with an assessment a few months ago showing that we are likely to reduce emissions by 2010 by 3-4% compared to the base-year 1990, not the required 8%.

This being said, quite a number of policy measures are being planned, both at the EU level and at member-state level. Some measures were recently decided upon and have not yet yielded results. Even though I would have liked to have seen more in terms of action, I do think that what we have done so far is quite impressive. But additional measures are needed and will have to come. Our approach to emissions reductions consists basically of five parts:

- I. Enhance energy-efficiency – the potential is great.
- II. Invest progressively in renewables.
- III. Adopt the cleanest possible technology for the use of fossils.

- IV. Increase R&D in energy efficiency and renewables.
- V. Apply a cost-effective approach.

The following action has been decided upon so far:

- I. European climate change program adopted.
- II. Doubling the share of renewables in the energy mix, from 6% today to 12% in 2010.
- III. Renewables should provide 22.5% of electricity generation in 2010.
- IV. 15-20% of transport fuels in 2020 should come from biogas.
- V. Energy efficiency action plan adopted, at least 1% gains per year in addition to efficiency gains because of structural change (0.5-1%).
- VI. Strict measures for energy efficiency in all new buildings.
- VII. New legislation to encourage energy efficiency in electronic equipment and appliances.
- VIII. Demand-side management to be introduced within the liberalized market for electricity and gas.
- IX. New incentives introduced to encourage the development of CHP (combined heat and power).
- X. Voluntary agreement with car manufacturers to reduce carbon emissions for all new cars (the only measure so far introduced that is unlikely to yield the expected results).
- XI. A system of Carbon Emissions trading has been decided upon and will start in 2005.
- XII. R&D Budget for renewables and energy efficiency increased.

A great challenge in the years to come will be to bring the candidate countries in line with all these new policies.

Given the vast differences of opinion on either side of the Atlantic, one possible way to narrow the differences, and hopefully reach agreement, would be by appointing joint task forces, comprised of representatives from politics, business, and science as well as civil society, on some of the major issues of contention. To organize such task

forces in the form of scenario work would be one possible way forward. Based on my own experience, I know that when participants can work collaboratively together on the most likely scenarios for their collective future, opportunities are great to reach agreement as regards what kind of future to work for.

The task forces would focus on issues such as the science of climate change (including the risk that the climate system could suddenly flip), the costs of climate mitigation (both of emissions reductions but also the costs of doing nothing), and the opportunities for engaging developing countries more fully, including what kind of financial support that would entail.

There is a tendency in society to be discouraged by seemingly high costs in the near term whereas serious consequences – and high costs – in the future are downplayed, partly as a result of the way costs in the future are discounted into today's value. Special focus ought to be given to things that are useful to do anyhow – the so-called “no regrets” policy – like investments in efficiency and reductions of other pollutants motivated by health concerns.

Carbon emissions from transport increase rapidly in the US as well as in the EU. This is an area which merits special attention and where working together should be attractive. Emissions from vehicles are very much in the limelight. But just as important would be to focus on transportation by air. New research in the UK has shown that the radioactive effect of emissions from airplanes is three times stronger than previously believed. Since travel by air has been more than doubling in the US as well as in the EU over the last decade, there are strong reasons to try to curb carbon emissions in this area.

Another obvious field for cooperation and a joint task force would be in the area of technology development. The role of technology is crucial in addressing the problem of climate change. The costs for new technology, like wind energy, have come down significantly in recent years. The role played by the public sector is central, both when it comes to R&D and with regard to market entry. For instance,

there are many positive examples both in Europe and in the US of the important role public procurement can play.

Another important issue for a joint task force would be in relation to trade, i.e., WTO and the Kyoto Protocol. The main question of course is how to deal with free riders, i.e., a situation where European and American companies would face drastically different obligations with regard to carbon reductions.

Finally, let me elaborate a bit on our relations with developing countries. It is hard to understand why so little has been done in the past to help developing countries bypass the most polluting stages of modernization, even in the field of energy production. Access to energy is a crucial element for poverty reduction. In spite of this, support to energy has not been a priority within development aid. Less than 5% of EU aid has been allocated to support capacity building and/or pilot projects in the field of energy. The only specific funding at international level to promote environmentally benign energy investments has been the Global Environment Facility (GEF). GEF has supported “green energy” by an estimated US\$250 million per year over the last decade. At the same time we know that investments in energy production in developing countries amount to a minimum of US\$125 billion a year, the vast majority in conventional technology. Moreover, many of these investments have been actively promoted by the export-credit agencies of industrialized countries! We need a crash program to support energy for development in developing countries – a program that gives priority to energy efficiency and renewables. Here again is an area where close cooperation between the EU and the US would be of great importance.

In addition, increased efforts to address the challenge of sustainable energy in developing countries would hold out hope for the fresh-water situation. An increasing number of developing countries suffer from water scarcity and the problem is getting worse. As a friend said the other day, “If you think the Middle East is messy now, just wait until there is a real water crisis”. Only two countries in the Middle East – Iraq and Syria – are well endowed with water. All the rest are

subject to severe water stress. A breakthrough in technology for desalination of sea water is highly desirable.

To summarise:

The initiative by the Stiftung Wissenschaft und Politik, Brookings Institution and German Marshall Fund is commendable. Climate change has to be given much more attention and priority within the Transatlantic Policy Dialogue. We are at a turning point in history. Our present economic framework seems to be lacking the right incentives to address some of the major problems facing society, not the least of which is the problem of climate change. Moreover, we seem to be lacking the ethics required to deal with problems whose consequences are distant in time and space. More specifically, we lack the capacity to deal with environmental problems that tend to get worse when incomes rise.

We cannot disconnect our lives from others. We have to see the world as a whole. If the production and consumption systems developed in the North lead to destroyed livelihoods in the South, we have to rethink our model and come up with something that is environmentally sustainable to all citizens on earth.

I very much hope we can establish a process together with our American friends that will effectively address the different perceptions as regards climate change that do exist on our two continents. The challenge is a double one: If we do energy right, many other problems, in addition to climate change, will be effectively tackled.

The problems we face are difficult. Yet I am an optimist. Technology developments are positive. Advances in technology are beginning to offer clear alternatives for economies to diversify their supplies of energy and reduce their demand for fossil fuels. Moreover, some of the leading companies – like Shell and BP – are leading the way. Why more is not happening is because of a combination of vested interests, policy tactics, market failures and too little money backing the new and much more efficient technologies.

If we look back at the oil crisis in 1973, it is quite amazing how

much has happened in terms of using energy more intelligently. And what we have seen so far is just the beginning. The potential for further savings are huge, particularly in the context of the information technology revolution. Dematerialization and efficiency gains ought to be able to help us effectively de-couple economic growth from energy demand. In order for all this to happen, however, we need to rethink the incentives structure of the economy.

I am looking forward to an exciting project of close cooperation across the Atlantic on these very important issues!

Let me start with a personal observation: There is growing concern among European industry, consisting of sixteen million enterprises with 170 million employees, that 90% of the firms do not know anything about Kyoto and have no idea of what it is going to imply for them. This is a very serious problem: The climate discussions are limited to the inner circles of policy negotiators and technological bureaucrats. So the market stakeholders know that there is something going on but they do not know what, and there is little to help them understand it. First, we have to make them aware that these things are going to change their work lives as well as the operation of their companies. Secondly, we have to help them to face this challenge and make the necessary transitions happen.

In the 1990s, there was a flood of environmental regulations: In 1990 we had nineteen regulation laws in the European Union relating to the environment. In April 2003, we had close to 600. All of them have an increasing impact on the daily business of our companies. For the average company, especially for the small – and mid-sized ones, keeping up with this enormous regulatory body has become almost unmanageable. So let me inform you that business is ready to face environmental responsibilities but that the regulatory body has to be restructured and simplified. This must be accompanied by a serious assessment of the impact of all particular regulations on industry. Big industries, such as oil and gas or mining, can easily find a way to move forward and deal with the current situation – though it would inevitably involve unnecessary expenditures – but others are in existential trouble. So we have to take some drastic steps in reviewing the approach on legislation.

Now let me direct your attention towards the topic of a long-term target of climate policy, and give you an industry perspective on this goal as well. All enterprises, one can imagine, live with a certain form of permanent schizophrenia. There is an obligation to provide data on a quarter-year basis, but we also have to make further predictions, ten

or twenty years down the line. So for all industry, and especially the oil and gas industry, a long-term strategy is the *business of the day*.

Secondly, there are two kinds of problems challenging any project in any company. One is to get the authorization, the permit, to start a particular project. The other is, at the end of the line, to present the project results, the efforts and profits, and to outline where to go from there. This is no different with regards to any environmental measure, e.g., a climate emissions reduction program. So yes, we are willing to become emissions traders, but we are also selling the prime mover of our economy, i.e., energy. These two things are inextricably linked. Both are major challenges and responsibilities of our companies, and they are two sides of the same coin. Without energy we go nowhere. I ask this audience for help. Help me with what I can tell my company about facing both challenges.

European and US companies have the money to develop new and sustainable technologies. In fact we have been developing new technologies since our beginnings. Also, we *can* put projects out that physically reduce the emissions in the atmosphere. There are *low-hanging* fruits out there, and there are “*middle-hanging*” fruits which are also approachable. They concern *all six* greenhouse gases, and they are *anywhere* in the world. So what we want is the simplest possible incentive to pick these fruits. What we do not want is to spend years and years trying to understand the complicated measures and policies and detailed regulations laid out by international political negotiation processes. Those got lost in technical details. We want to have a simple and easily understandable regime so that we are able to communicate it with colleagues and stakeholders in our companies. Only such a regime will in the end gain the support of industry on both sides of the Atlantic.

**THE REVIEW OF RECENT ACTION IN THE EU
AND US CLIMATE POLICY**

In order to understand the EU one has to acknowledge that in the EU we have many players. My presentation will be mainly related to Community actions. Apart from the Community actions we also have the actions at the level of the EU Member States. In fact, the fifteen Member States do set most of the policies in the European Union. Community actions, therefore, are a smaller part of the total picture in terms of what is happening in the EU.

Let me start with looking at the challenge ahead in the European Union. All Member States report to the Community because the Community also has reporting obligations vis-à-vis the Framework Convention. The graph presents the latest figures from 2001. The dotted line describes the linear path towards the EU's Kyoto target. In the last two years emissions have been increasing in the European Union. So, the Kyoto target is not an easy target for the EU Member States. A lot of hard work needs to be done in order to reach the target path. Looking at individual Member States, one realises that there is a great variability as to how far they are on or off the target path. At the end of the league, you will see Ireland, which is at present 23.9 percentage points above its linear Kyoto track. Reaching Kyoto is a very challenging task for Member States and the European Community.

How do we try to meet this challenge at the Community level? The European Climate Change Program started in the year 2000. This is a very huge process. The ECCP follows a number of principles like integration into all relevant policy fields, transparency, stakeholder consultation in order to build consensus on what type of policies should be implemented at the Community level. Over the past three years there were, in total, eleven working groups on all kinds of topics and themes. The approach these working groups were following is to look at the reduction possibilities in each of the sectors, and to make sure that the most cost-effective measures are selected taking account of the ancillary effects, because climate policies have positive effects in other areas, e.g.

job creation, air quality benefits and or energy security. Other working groups were exploring cross-sectoral issues like emissions trading. All these working groups were existing for one to two years. The reports were written by the working groups. The policies and measures were analyzed and then a steering committee was making recommendations for the Commission on where to take action and where not. We have had two rounds of policy identification. The first phase concluded before the COP in Marrakech and then after Marrakech a second round of working groups started. On the slide, the first ones included the groups from Emissions Trading down to Industry, while the working groups further down on Fluorinated Gases, Research, Agriculture, Sinks and Forestry were established after Marrakech.

In terms of the kinds of environmental policy instruments that were proposed, you will see a full mix of different policy instruments, including “soft” approaches like voluntary agreements, awareness raising, consumer information and product labelling. More “firm” policy instruments consist of environmental standards, taxation and subsidies. On taxation, the European Community does not have competences so the Community can only set a broad regulatory framework. The ECCP, for instance, was looking at energy taxation. There was a communication earlier this year and a directive that sets a framework for Member States. But the Commission works more on the incentives/subsidies side. That means financing demonstration programs for new technologies. You might have heard recently of the launch of the CUTE program testing hydrogen buses. One test project is run in Reykjavik together with Iceland and Daimler-Chrysler. There is also the LIFE Environment budget line encouraging private sector in Member States to do demonstration projects covering a wide area, e.g. combined heat and power, biomass, energy efficiency programs. It promotes technologies that are close to being ready for the market and try to demonstrate their readiness. Then, also the EC’s Research and Development Program is part of the public spending for climate change in order to stimulate innovative climate research.

The last policy instrument, and probably the most important one at the Community level is the EU emissions trading scheme which is a “cap and trade” system.

In terms of the total reduction potential of all the identified measures, one looks at something between 570 and almost 700 million tons of carbon dioxide equivalents per year. This is twice the Kyoto minus 8%, so minus 8% from the 1990 target. The measures that are currently in implementation would result in a reduction of 276 to 316 million tons of CO₂ equivalents per year.

Our flagship among these measures is certainly the EU emissions trading scheme. It will cover approximately 45% of the CO₂ emissions in the European Union. The Directive was adopted early on this year and soon it will be published in the Official Journal. At present Member States and the Commission are very busy in order to implement its provisions. One important activity is the definition of the national allocation plans. There are between 10,000 and 20,000 installations in Europe that are covered by the EU Emissions Trading Directive. Now, it is the Member States’ task to allocate the allowances to these installations. You will be seeing increasing press coverage in the different countries. Colleagues in Member States are working very closely with industry in order to move ahead on the allocation plan. The Member States will have to present the allocation plans to the European Commission on the 31st of March 2004, and then the Commission will scrutinize them and approve them within a period of three months. So that should happen April, May, June. End of June, beginning of July, we should see the first national allocation plans being approved by the Commission.

At the same time the services in my unit are working on establishing the Community registry and a transaction log, in order to track the allowances. Furthermore, a monitoring decision will need to be adopted in early 2004 defining a monitoring system for the EU emissions trading system.

On January 1, 2005, the emissions trading should commence. It will be the largest emissions trading system in the whole world. So, we are quite excited on our side, and will probably have many sleepless nights over the coming year before we see it really up and running. As today we are talking about transatlantic relationships, it should be noted that when designing the emissions trading program we had a very close look at the American SO₂ system and the NO_x trading system. We have been working very closely with the experienced experts on the US side in order to design the EU scheme. So from that point of view we feel quite confident that also the European emissions trading scheme should be working, like the SO₂ and the NO_x is working the United States.

In terms of new policy proposals what is at present on the table is the so-called "Linking Proposal", which is an amendment to the Emissions Trading Directive. It will create the possibility for private companies to generate credits in countries outside their own countries. In essence it will allow JI and CDM credits into the EU emissions trading scheme. This proposal was tabled just before the summer break and is now under debate in the Council and will soon also have its first reading in the European Parliament. The Linking Proposal is built very closely on the Marrakech accords, so you will see that, for instance, nuclear projects are excluded from JI and CDM projects. At present, also sinks projects are excluded from the proposal. The major reason is that sinks and CDM are still discussed in the UNFCCC. Until these negotiations have not been concluded, the EU should not pre-empt the final decision.

Another proposal that is currently discussed is the one on F gases which is a fairly standard piece of environmental legislation looking at the containment and/or phasing out of F-gases in many sectors, like mobile air conditioning. If you have a close look at it there is also a little element of trading in the proposal, but also this one is currently discussed with the Council.

At the end of the year, the Commission is going to table an Environment Technology Action Plan. This is already thinking going into the period of post-2012. So, what needs to be done in terms of further technology development, how can we better focus our research programs to address our future challenges.

We are very aware of the critical areas, in terms of where we need to have to do further work. That is certainly in the transport area where we see emissions growing quite rapidly. It is a sector currently under scrutiny within the Commission. We are looking at how sustainable mobility could be achieved. There are some very good pilot programs in Europe. If you look at London, for instance, in terms of how traffic volume is handled there. If you look at Germany, there is a scheme that hopefully will be up and running soon, after all the teething problems.

Another area where the Council has been tasking the Commission to look at is bunker fuels, particularly from aviation. So that is also something we are actively looking into, what can be done in the coming years in this field. A third area is certainly energy liberalization, particularly the use of state aid in the energy sector, whether further steps need to be taken there. And finally, the Community's long-term Research and Development Program will have to be defined.

For the coming year, it needs to be taken into consideration that the terms of the current Commission and the European Parliament will end, so you will not see major new legislative proposals coming through in the coming year. What will the Commission be doing in the first half of next year on the European Climate Change Program: looking at success stories in terms of policy instruments, not only at the Community level, but also at the Member States level, in order to improve information exchange among Member States. Then, we will explore new options for legislation, what could be discussed with the new and incoming Commission in November.

What is also important for the European Commission is the date, the 1st of January 2006, because then the Community will have to report to the UNFCCC on demonstrable progress. So that is certainly an area we will be working on in 2005 in order to get our reporting ready.

Another important date next year is the 1st of May, when we will have ten new Member States. I think that will also mark more or less a start of new discussions on post-2012. Next time we will have to negotiate not among 15 Member States, but among 25 Member States.

As the Commission strives to be a transparent organization, and our legislation requires us to make everything public, you will find most of the detailed reports on our webpage. If you have any further questions you can always contact us by e-mail.

It's clear, I think, that there's a widespread impression, particularly in Europe, that the United States is not taking climate change seriously and has been acting unilaterally in its approach to climate change because of its rejection of the Kyoto Protocol. I'm going to posit that this is not the case, but rather that the US is actively engaged, both domestically and internationally, and in particular with a number of EU Member States as well as the Commission, on a number of new climate change initiatives.

The US climate change policy, as articulated by President Bush in his June 2001 and February climate change policy announcements both reaffirm the US commitment to the United Nations Framework Convention on Climate Change and its ultimate objective-to stabilize atmospheric greenhouse gas (GHG) concentrations at a level that will prevent dangerous human interference with the climate.

The policy recognizes the need to take near-term actions while maintaining economic growth, and it is also grounded in the reality that addressing climate change is going to take many generations and will require a global approach. We also believe that it is going to require the development of new transformational technologies during the coming century that will allow us to use and produce energy with little or no net emissions of greenhouse gases, and technologies also allow the use of abundant fossil fuels.

There are three basic components of the President's policy.

First of all, slowing the growth of emissions, setting a national goal of greenhouse gas intensity to 18% over ten years. This is opposed to our projected business-as-usual of a 14% improvement. That basically means there is a 4-1/2% reduction in emissions from business-as-usual over a 10-year period from 2002 to 2012. Accumulatively, that is a re-

duction of approximately 500 million metric tons of carbon equivalent over the period and about 100 million of that in 2012.

The second component is laying the groundwork for both current and future action by considerable investments in science and technology.

And the third component is international cooperation, which is the lead role of the State Department.

If we look at the policy elements, to support the near-term goal as well as to address the long-term challenges, we have more than 60 Federal and many more State programs in place to help slow the US greenhouse gas emissions growth.

Examples include the Federal mandates that we have on Corporate Average Fuel Economy Standards-and we are actually tightening-up slightly on light trucks. We also have appliance standards and clean air standards and regulations. There are also a number of States that have been quite active. California has been mostly in the news, but we do have a number of other States that have enacted Renewable Portfolio Standards. And, in fact, we have several States that have actually imposed restrictions on carbon dioxide emissions from power plants.

We also have numerous voluntary programs. We are relying heavily on the voluntary approach. Let me just mention a couple of recent ones.

The Climate Vision Program is a Department of Energy program, which was launched in February of this year. It's a sectoral program working principally with trade associations, and participants in the program account for something over 40% of US greenhouse gas emissions. Under Climate Vision, various sectors have agreed to meet specific commitments to reduce their emissions.

The second program, also fairly recent but slightly older than Climate Vision, is the Environmental Protection Agency's Climate Leaders Program, which works with individual companies. There are approximately 40 large corporations in this. Under this program, the corporations are taking specific pledges to reduce or limit the growth of greenhouse gas emissions over the next five to ten years.

Certainly, we are promoting the expanded use of clean energy and energy efficient technologies and transportation sector improvements, particularly in the short run. In debate before the Congress now is the President's Energy Bill. As sent up to the Congress, it included over 5 billion dollars in tax incentives for renewable energy and energy efficiency technologies, investments by both companies and businesses—some 5 billion dollars over 5 years, and it would amount to 8 billion dollars over 10 years. That is being debated before Congress now.

In a third area, we have increased incentives for carbon sequestration on America's farms and forests. The Farm Bill, which was passed and enacted last year, includes some 47 billion dollars over 10 years for various conservation programs that would impact and increase the amount of carbon storage both in farmlands as well as forests. Our US Department of Agriculture estimates that we will get about 12 million additional metric tons annually by 2012—that's million metric tons of carbon equivalent.

Fourth, we are making improvements in our existing Greenhouse Gas Registry, the so-called 1605(b) Program. Our Department of Energy has the lead on this, working with the Environmental Protection Agency and the Department of Agriculture, as well as the Department of Commerce. Also, we hope to have this out for public comment in the Federal Register in the near future. It will also provide not only baseline protection so that those who take early action will not be penalized under more stringent future climate regime, but also transferable credits for real emissions reductions.

We are also providing unprecedented funding for climate change programs. It is running to about 4.5 billion dollars annually-1.8 billion of that is in our Climate Change Science Program and about 1.6 billion dollars on energy technologies.

And last is international cooperation. We've significantly increased our bilateral cooperation. We now have 13 agreements, again non-legal agreements, but agreements to cooperate, with a heavy emphasis on climate change science and technology. We also conduct policy discussions in a number of these countries. Seven agreements are with developed countries including the European Union, as well as Italy, and developing countries include a group of seven Central American countries, China, India, Korea, Mexico, and South Africa. Collectively, with the United States, this group accounts for approximately 75% of global carbon dioxide emissions.

Now let me just turn briefly to our multilateral initiatives. We have initiated over the past year three major science and technology initiatives.

We heard last night about the Earth Observation Summit. The ministerial was held in Washington at the State Department on July 31st. It was then followed up by a two-day meeting at the expert level under the so-called GEO, the *ad hoc* Group on Earth Observations. We had over 50 nations and international organizations participating in this. Just focussing on the EU participants: Denmark, the Commission, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, and the UK. The goal here is to design and implement over the next ten years a new and sustained comprehensive Earth Observation System. As we heard last night, the next meeting will be right before COP9, nearby in Baveno. We're very pleased with the way that is progressing.

The second activity is the Carbon Sequestration Leadership Forum,

which was held in suburban Washington earlier this year. This is focussed primarily on capturing the carbon out of flue gas streams from the combustion of fossil fuels and then storing it-developing the technology to do the capture, separation and storage, whether in geological formations, aquifers, etc. In the ministerial we had some 13 partners in that. Once again, with active European cooperation there in terms of the Commission, with Italy, Norway-I guess Norway is certainly European-but not considered part of the EU, but also very important developing countries with large coal reserves such as China and India. We know of Cedric's organization's projections of increased fossil fuel use over the next 25 years. The reality is that fossil fuels are going to be used, more coal is going to be used, and we really need to develop the technology to allow it to be used in an environmentally friendly manner.

The third large initiative is called the International Partnership for the Hydrogen Economy. The purpose is to coordinate multilateral research and development programs to help advance this technology. We are going to have a ministerial in Washington next month and some 13 countries, plus the Commission, have been invited. Not only the Commission but, in terms of European participation, France, Germany, Italy and the UK will also be part of that.

An initiative that is also US-led and which has been going on for a couple of years now is in the nuclear regime, the so-called Generation IV Program. It is a US-led effort to develop a new generation of reactors, which will hopefully be inherently safe, more proliferation resistant and generate less waste. Once again, European participants in that include France and the UK.

So, time is running out, and I am just going to stop here. But I just do want to briefly mention that the US did rejoin the ITER, the International Thermonuclear Experimental Reactor Project, which has been long underway and involves the Commission, Japan, Russia-and China

and Korea have recently joined. It is a project to build a prototype of a small nuclear fusion reactor. I think a decision is to be scheduled later this year on exactly where that is to be built. There are several sites proposed. One is in Japan. Europe has two sites proposed, one in France and one in Spain. Then Canada has a site. So we are looking forward to participating in that.

Anyway, we believe that taken together these multilateral research and technologies initiatives, certainly, if successful, will add up to what will be a revolution in our energy systems. Not only will these technologies, again if successfully developed, put us on a long-term path to stabilizing atmospheric greenhouse gas emission concentrations, but they will also ensure secure, reliable, affordable and clean energy to power economic growth and development across the globe.

So, in closing then, I want to emphasize that the United States is engaged, both domestically and internationally. We are investing billions of dollars annually in climate change, both in the near-term and long-term, and we are leading many international, multilateral and bilateral efforts, many of which involve EU Member States and the Commission. I believe that while we differ in our approach to addressing climate change, we need to keep in mind that we're all working together towards the same goal and we need to build upon what we are doing. Resources are scarce and, I think, particularly in the technology area it offers a great opportunity to marshal our resources and make most effective use for them to move ahead for the long term.

WORKING GROUP POLICY PAPERS

CLIMATE CHANGE: THE CASE FOR LONG TERM TARGETS

Michael Oppenheimer¹, Friedemann Müller²

Human-induced climate change is without doubt the most troubling and complex environmental problem facing most countries individually as well as the world as a whole. Consideration of the unique scientific, economic, and political characteristics of climate change strongly suggests that a long-term international objective would be a key element of any effective solution of the problem. Here we present the rationale for choosing such a target, discuss alternative formulations, and consider how a target might be adopted and implemented.

– The Problem

Greenhouse gases, particularly carbon dioxide from fossil fuel (oil, natural gas, coal) burning, trap heat that would otherwise escape into space. Their atmospheric accumulation has increased markedly since pre-industrial times due to human activity. The natural greenhouse effect (due to natural levels of these gases) maintains an equable climate by keeping Earth about 30 degrees Celsius warmer than it would otherwise be. The enhanced greenhouse effect resulting from industrial emissions and other sources will inevitably lead to a yet warmer Earth. If emissions are not constrained, Earth will likely warm well beyond temperatures experienced in the 10,000-year history of civilization, and much faster than previous sustained global climate changes of that era. Earth has warmed about 1 degree F (about 0.6 degree C) over the past 140 years and the Northern Hemisphere is probably warmer than any time in the past 2,000 years at least; the buildup of greenhouse gases is very likely the major contributor to these changes. Pro-

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jected growth in fossil fuel combustion represents an unprecedented environmental risk. While the pre-industrial concentration remained relatively stable at 280 ppm it has since grown to 370 ppm and could approach 1000 ppm in this century if no policies or measures are undertaken to restrain its increase. In order to limit the corresponding risk it makes sense to bring those who understand the relevant atmospheric processes together with economic and political decision makers, and other stakeholders. The challenge is to define a target which is commensurate with the risk given substantial uncertainties, in accordance with the common agreement binding all parties:

Almost all countries (including the US, China, India, the EU and Russia) have ratified the UN Framework Convention on Climate Change (UNFCCC), whose Article 2 describes its long-term objective as avoidance of “dangerous anthropogenic interference” with the climate system. The following discussion provides the rationale for implementing Article 2 in terms of a quantified long-term target, to be determined on a preliminary basis within this decade.

– Troublesome Characteristics

Four characteristics of the science of climate change provide the rationale for a long-term view.

1. The gases *persist in the atmosphere* for periods ranging from a decade to more than a millennium after emission. As a result, policies, which take decades to implement fully in any case, can only gradually slow the greenhouse gas accumulation. A related consequence of persistence is that relatively large emissions decreases, on the order of half or more, would be required to quickly halt the growth of greenhouse gases in the atmosphere.
2. There is a *lag between emission and consequence*: The full effect of the gases is not felt for several decades or longer after their emission due to the thermal inertia of oceans and ice

sheets. Analogy has been made to the relative coolness of coastal areas on warm spring days. Putting these two characteristics together, we note that limiting climate change is NOT like dialing a thermostat. It is more like steering a supertanker, with much anticipatory decision-making needed.

3. Warming is expected to be continuous until emissions are markedly reduced. *There is no known limit to warming until the sources of the gases, like oil and coal supplies, begin to shrink.* In the meantime, absent policy, atmospheric carbon dioxide amounts, now 30% above pre-industrial levels, could more than quadruple compared to pre-industrial levels.
4. Due to the first three characteristics, short-term emissions goals considered in isolation provide no test of the ultimate climate response. Furthermore, uncertainty in projection of changes is very large and the time for progress in understanding is measured in decades not years. *Unpredicted, surprise outcomes are almost inevitable*, becoming more likely as the accumulation of greenhouse gases increases.

Beyond the science of the problem, analogous difficulties arise. Emissions growth may be slowed with existing technology but multi-decadal time scales will be needed for development and implementation of new technologies to substantially reduce emissions (or capture gases post-combustion). Multi-decadal time scales will also be needed to fully develop and implement innovative policies needed to bring these changes about. Taken together, these characteristics argue strongly for defining long-term objectives for climate stabilization (as discussed below) rather than implementing policy piecemeal.

Short-term international *emissions* objectives (and accompanying national emissions obligations), like those embodied in the Kyoto Protocol, are determined fundamentally by political and economic feasibility. A long-term international target would be fundamentally determined by an assessment of environmental risk from *the* accumulation of emissions. An appropriate target (for example, as outlined in Article 2 UNFCCC) would allow decision-makers to *synchronize* near term

steps to assure that their cumulative effect would be consistent with the avoidance of excessive long-term risk. In other words, it would make clear what options are preserved for the long term at every step, which risks are increased or decreased by particular near-term choices.

– Political Rationale

A long-term target may satisfy three objections raised against the Kyoto Protocol that have proven to be serious political obstacles. The business community is divided over climate policy. Some firms stand to gain substantially from the nascent market in emissions allowances for greenhouse gases and have implemented measures that reduce emissions and will ultimately lead to their possessing significant numbers of tradable emissions allowances. Some firms stand to lose, particularly those in the coal industry. For yet other firms, the result of implementing Kyoto is mixed, at least in the near-term.

But nearly every firm, whether a supporter or opponent of emissions reduction, has argued that a long-term goal (i.e., 25 years or longer) would improve its ability to plan capital turnover. The lack of one has led firms that are otherwise supportive of action to refrain from supporting the Kyoto Protocol, which has a ten-year time frame for obligations. It has certainly stiffened the backs of Kyoto's opponents.

Another objection to Kyoto is the lack of mandatory obligations for developing countries. The latter is one of the two ostensible rationales for US rejection, the other being concerns over cost. Yet developing countries are highly unlikely to assume such obligations absent a long-term objective that indicates roughly how large is the limited size of the atmospheric resource to be used. How many total tons of carbon dioxide will ultimately be emitted? The answer to this question depends on a definition of how large a greenhouse effect may be considered to be "safe" (or "dangerous"). Until a goal is determined, developing countries are unlikely to enter into a negotiation over burden sharing. By taking a global view, a long-term target based on risk al-

lows questions of equity of the solution (as expressed in near-term targets) to be separated to some extent from quantitative issues of size and distribution of impacts, a separation that may facilitate negotiation of both long- and near-term obligations.

Finally, multiple long-term *domestic* targets would be insufficient because there is a need to assure a uniform international standard against which to measure domestic action. Otherwise, questions of fairness, particularly with regard to trade relationships and competition on investment, will arise continually. Through an international long term obligation, each party receives a modicum of assurance that its near term domestic action is both appropriate to the long-term risk, and proportional to the activities of other nations.

– Technical Issues

Views differ on whether to define a target in terms of greenhouse gas concentrations, temperature change, rate of warming, or other quantities. No one measure is perfect, but greenhouse gas concentrations have several advantages:

1. From a legal perspective, this choice would be consistent with the explicit language of Article 2 of the UNFCCC.
2. Concentration is a routinely measured, spatially uniform quantity for the major human-made greenhouse gases, carbon dioxide and methane, as well as for several of the minor ones. It has little year-to-year or decade-to-decade variability compared to its long-term trend. Annual, decadal, and spatial variability of temperature change is greater compared to its trend.
3. Although it is often said that temperature is more closely related to impacts than concentration, this is only true for local or regional temperature near the point of impact. Global temperature changes are not necessarily more easily related to local temperature changes than are concentrations. Furthermore, temperature change does not encompass the full range of climate effects, like precipitation and runoff, that determine impacts.

4. A set of near term limits for global emissions can be derived that are consistent with a long term upper limit on greenhouse gas concentrations. This approach establishes a necessary scheme for emission restrictions and burden sharing.

A second problem is whether to define a target in terms of carbon dioxide alone or in terms of the equivalent effect of all the measured greenhouse gases. The language of the UNFCCC would mitigate in favor of expressing the target in terms of all gases (i.e., CO₂-equivalents). The scientific perspective would argue for counting the effect of all gases since all gases will determine the ultimate risk. The technical obstacles to doing so arise from the spatial non-uniformity of ozone and particle concentrations, which result in spatial variation of climate effects. A compromise position would be to develop a target in terms of carbon-dioxide equivalents of the spatially uniform gases, but with awareness that its effect is contingent to some extent upon the behavior of the other forcing agents. Given the various uncertainties in determining a target, this is not the largest.

– Is Agreement on a Quantitative Target Feasible?

The most vexing issue is whether a quantitative target can be defined at all in the context of scientific uncertainties, and how such a globally uniform objective could be achieved and the necessary burden sharing be enforced on individual parties. Solution to both problems can be envisioned through a process of iterative implementation via near-term emissions budgets of the sort embodied in the Kyoto Protocol. A long-term objective, however, is indispensable in order that these near-term emission budgets not miss the target.

It would be preferable to begin an informal process immediately (involving scientists and other experts, NGO's and other stakeholders, and the business community) that can stimulate and inform a governmental negotiation beginning in a matter of years. The IPCC would have an important role to play in evaluating vulnerabilities and options germane to implementation of Article 2. Formal choice of a target

would be seen as a first step subject to periodic revision, perhaps every ten years, to accommodate current uncertainty and future learning.

Negotiation of near-term emissions obligations would be carried out with the objective of maintaining consistency with the current long-term target. Only in this way can plausible options, such as a limit in the range of 450 ppm CO₂, be maintained as viable options. At the same time, choice of a quantitative long-term target does not uniquely determine near term obligations. Rather, it allows a range of choices that have a substantial chance of meeting the long-term objective when coupled with plausible options for subsequent periods.

An important objection that has been raised to the proposed approach is the degree of effort needed to reach agreement on such a target in the context of very large uncertainties. An alternative approach has been discussed which would involve an informal target, not binding on negotiators in any sense. The difficulty here is that a target that is not regarded as binding on negotiators is likely to be diluted in implementation, or totally ignored. It also would lose its function as an orientation for those who take the risk of long-term investment.

One sensible approach to dealing with uncertainty would be a precautionary one. Focus first on those outcomes, like collapse of the thermohaline circulation, disintegration of the West Antarctic ice sheet, or loss of the Greenland ice sheet, for which general agreement on the importance of avoidance could be more easily achieved. Then define a long-term target according to the lowest concentration that could plausibly generate the undesired outcome.

The world seems to be at a decision point. Countries can either determine future commitments to emissions limitations or emission-reducing policies in a context detached from long-term environmental risk, or they can choose to engage in a complex negotiation of an initial target, one that would be updated over time. In the former case, it would be pure happenstance if the accumulation of unguided near-term steps were to avoid “dangerous” climate change. A serious political

obstacle to developing country participation would remain in place. The business community may continually bridle at near-term commitments defined without any notion of ultimate objective. While the latter choice may present serious difficulties to negotiators, the former option is almost sure to fail to successfully rein in global warming.

PROMOTING CLIMATE-FRIENDLY TECHNOLOGIES: INTERNATIONAL PERSPECTIVES AND ISSUES

*Michael Grubb*¹, *Richard Stewart*²

– Introduction

It is widely recognized that achieving limitations on greenhouse gas (GHG) emissions at acceptable social cost will involve far-reaching technological change in the energy and in other sectors. Indeed, at present this seems one of the few things on which there is transatlantic agreement in relation to climate change. Cooperation to promote development of low-GHG technologies thus appears as a natural issue to consider as a focus for rebuilding a constructive transatlantic dialogue. There are, however, disagreements among academics and policy analysts regarding the best way to promote appropriate technological change in the climate context. There are also practical institutional challenges in devising and successfully implementing policies, both at the domestic and international levels, that will successfully promote the needed innovations. This paper simply seeks to frame the issues presented.

– Opposing views on technology development in the climate context

Reviews of economic studies show consistently that assumptions about technology development are crucial to economic and policy conclusions (eg. Dowlatabadi 1998; Edmonds et al, 1999; World Resources Institute, 2000). The climate policy debate is often characterized by two polar views.

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The “technology push” view holds that the primary emphasis should be on development of low-GHG technologies, typically through publicly funded R&D programmes, rather than regulatory limitations on emissions. Proponents of this view argue that, given that climate risks are a function of long-term accumulation of GHG in the atmosphere, it would be preferable to concentrate in the near term on investing in technological innovation, and adopt emissions limitations later when innovation has lowered the costs of limiting GHG emissions and the existing capital stock turns over, rather than mandating costly reductions now (Wigley, Richels and Edmonds 1996)³.

The opposing “market pull” view holds that technological change must come primarily from the business sector, and is primarily a product of economic incentives. In the climate context, this view gives priority to adoption of regulatory measures such as technology-based regulatory limitations, GHG emission caps, or charges. Profit-seeking businesses will respond by innovating to produce technologies that will reduce emissions at less cost in order to gain competitive advantage over rivals⁴. From this perspective, postponing emissions limitations would simply defer the whole process of innovation required for the private sector to produce these solutions. Proponents of this approach might acknowledge various market failures with respect to the early stages of innovation; business firms may not have adequate incentive to invest in basic research because they may be unable to appropriate (through patents, etc.) the knowledge gained, and because the commercial payoffs may be too uncertain and long-term. But “market pull” advocates tend to assume that existing general po-

3. A recent paper in *Science* by Hoffert et al. (2002) received widespread attention for its assertion that technologies to solve climate change do not yet exist, and it called for a grand technology programme encompassing new nuclear and space-based energy sources to solve the problem.

4. This perspective draws on a considerable literature on induced technical change (eg. reviewed by Weyant J.P. and T. Olavson (1999), with implications for policy considered eg. in Grubb et al. (1995); Dowlatabadi (1998); and Grubb, Koehler and Anderson (2002).

Lomborg (2001), includes an extensive (and widely cited) sceptical chapter on climate change culminated with the assertion that the problem of climate change would largely solve itself anyway because market forces would make renewable energy the preferred technology even in the absence of regulation.

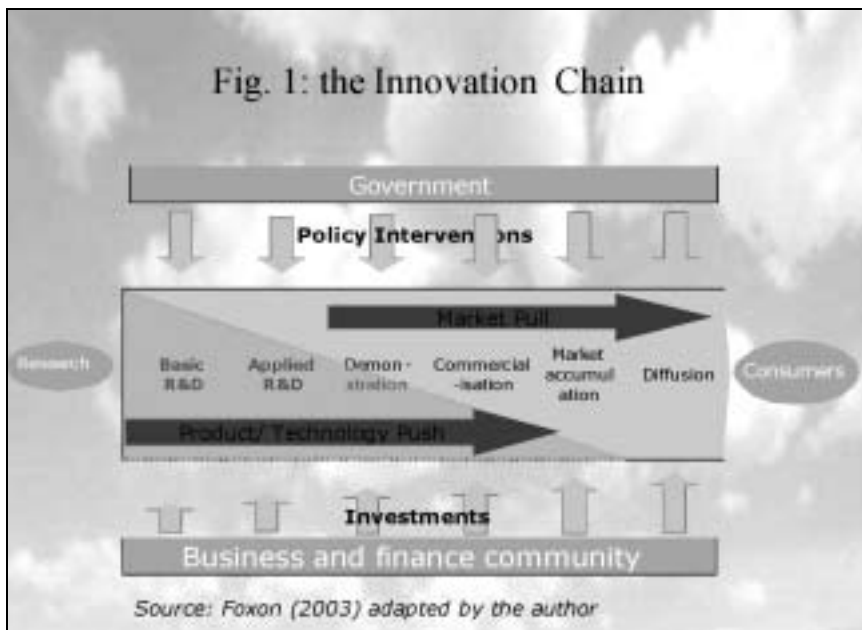
licies (such as corporate tax breaks for R&D expenditure) are sufficient to overcome these failures⁵.

Thus, divergent perspectives on the *process* of technology change lead to directly opposing *policy prescriptions*, in many dimensions, as summarised in Appendix I.

– Establishing a common understanding of technology innovation

This debate should be resolved by recognizing that innovation is a complex phenomenon which in reality encompasses both perspectives. Whilst engineers tend to focus upon R&D, economists since Schumpeter have tended to break innovation down into three components (invention, innovation, and diffusion) – but even this is clearly inadequate. Viewed more closely there are in fact at least six distinct stages to innovation in a market economy: basic R&D applied R&D demonstration; commercialisation; niche market accumulation; and diffusion. Each stage involves technology improvement and cost reduction, but the principal barriers and driving forces change across the different stages: ‘technology push’ elements dominate early stage research, whilst ‘market pull’ is increasingly important as technologies evolve along the chain (Figure 1).

5. There is far less need for regulation to create market incentives for innovation in technologies to facilitate adaptation to climate change, but there is need for publicly funded R&D in adaptation measures.



This framework (which to our knowledge has not been elaborated in published literature) helps to reveal the conflict between the technology push and demand pull views as a false dichotomy, and provides a framework within which a balance between the extremes can be struck. Government has a key role throughout, but its role changes radically along the innovation path. It finances basic R&D in order to lay a foundation for applied R&D and commercialization by business firms; sole reliance on demand-pull strategies will, because of market failures, not achieve the far-reaching, long-term innovations required to address climate change. Government, however, must also adopt regulations to provide market based incentives for firms to invest in innovation. Business invests at all stages, but generally more in the latter stages, driven by amount and timing of expected payoffs to the firm. It is, however, important to send credible regulatory signals to business relatively early in the process in order to create

the incentives for the necessary investments. In sum, particularly for a big, long term problem like climate change, policy will be more powerful if emission constraints are combined with R&D and diverse supports to promote technology through different stages of the innovation chain.

– GHG regulatory measures and technology development

What types of regulatory measures are best calculated to stimulate technological innovations by firms by creating market demand for low-GHG technologies, products, and process and production methods and innovations in the use of sinks? The broad range of activities that generate GHG emissions and the long-term character of many of the innovations required argue powerfully for use of broadly applicable economic instruments, such as tradable GHG allowance systems or charges (Stewart and Wiener 2003). Nonetheless, command-and-control quantity limits have been able to successfully induce significant near-to-medium term innovation in particular sectors, for example with respect to automobile emissions of conventional pollutants, and may have a useful role to play with respect to some elements of GHG regulation. With respect to the timing of emissions limitations, the need for credible early regulatory signals to industry, the differing timetables for incremental and fundamental innovation, and capital stock turnover cycles argue for beginning with modest near-term limitations that are incrementally tightened within a regulatory framework that commits to appropriate emissions reduction pathways over time. (Stewart and Wiener 2003).

– Institutional challenges of public-funded technology development

Because of potential scale economies, cooperative specialization, and mutual learning, there is wide scope for beneficial international collaboration in publicly funded R&D for innovation in low-GHG emission and sequestration technologies as well as adaptation technologies. But such efforts face two basic sets of challenges.

First, any public expenditure on technology promotion is immediately faced by a flood of applications from those who believe they have the answer, if only governments would fund it sufficiently; and from companies that scent a chance of free money for something they might have done anyway. Critics – especially economists – can point to long lists of government-sponsored technology failures, some of them astonishingly expensive, due to phenomena that social scientists well recognise in terms of institutional capture. As one cynic put it, ‘governments may be bad at picking winners, but losers are good at picking governments’. Good management, set against clear criteria and firm accountability mechanisms, is thus essential.

Second, some of the institutional problems in public R&D are amplified in the context of international technology programmes, where the goal of cooperation among countries is bedevilled by unavoidable issues of competitive rivalry. Every government would like its own industry / technology to receive support from international sources, especially if there is a significant prospect of it delivering commercial success, and is reluctant to spend on technologies of other countries. In addition, as technology nears commercial applicability, issues of intellectual property can become highly sensitive, leading to the reverse of cooperation as participants seek funding from the common pool whilst holding back their most commercially valuable ideas from public scrutiny. As a result, the easiest focus for international technology programmes is often technologies, such as fusion power, that no one realistically expects to be commercially viable in the foreseeable future. There are also problems of governance and accountability for international programmes, which almost inevitably acquire substantial institutional autonomy. If national programmes can be hard to terminate if the results do not fulfil the initial hopes, international ones can be even more difficult.

- Moving from generalised ideas of international technology cooperation to specific programme

In designing international programs for cooperative climate technology R&D, attention must be paid to the goals of the programme (object, scope, and time horizon along the path from basic research to commercial application); the basic R&D strategy and mechanism, extent of participation by different countries; and issues of institutional form, governance, and accountability mechanisms. In addressing these questions, one can draw on a considerable body of historical experience and ongoing programmes in the energy and international environmental fields.

In the context of the global environment, the most obvious example is the World Bank-UNDP-UNEP Global Environmental Facility, and associated World Bank and other carbon-related funds.⁶ These are not explicit technology programmes, but have made a significant effort to promote technology development in certain areas (such as biomass energy development and solar PV); more specific technology funds (such as bioenergy fund) have recently been added. As another example, the International Energy Agency has now accumulated almost 30 years experience of coordinating OECD efforts on energy, including an extensive set of 'Collaborating Agreements' on specific technologies. These programmes have now extended beyond the OECD to incorporate a number of developing countries.

In the specific area of international R&D programs aimed at climate-related technology development, at least six very different concepts have been floated:

6. The World Bank Carbon Fund finances GHG-reduction projects that will generate commercially valuable emission reduction credits under the Kyoto Protocol's Clean Development Mechanism. International trade in such credits, and of emission allowances pursuant to emissions trading systems, can provide funding for commercial development and application of new technologies to reduce greenhouse gas emissions. Thus, GHG regulatory/trading systems can both supply funds for R&D and create regulation-induced market demand for technological innovation. (Stewart and Wiener 2003).

Option	Objectives
Clean Energy R&D Fund	To provide specific R&D support to technologies whose high development cost cannot readily be borne by public funds in a single country.
Clean Energy Demonstration Fund	To provide development and demonstration support to technologies with global applications but where economic development benefits are primarily local, avoiding international IPR concerns.
Clean Energy Venture Capital Fund	To provide venture and development capital for smaller firms with climate related technological innovations
Emissions Reduction Purchase Fund	To put together a large fund for purchasing emission reductions to reward companies for developing carbon management discipline
Climate Leaders Fund	To offer an investment incentive to large companies to differentiate themselves within their sector by virtue of their ability to manage climate risk and seize solution opportunities
International Investor Initiative on Climate Risk	To mobilise mainstream institutional investors behind a programme of dialogue, education and research to assess and act upon the investment risks posed by climate change

Appendix I

The divergent policy implications of different technical change perspectives

Process:	Technology-push: R&D - led technical change	Demand pull: market-led technical change
	Technical change depends mostly on autonomous trends and government R&D	Technical change depends mostly upon corporate investment (R&D, and learning-by-doing) in response to market conditions
Economic / policy implications:		
Implications for long-run economics of large-scale problems (eg. climate change)	Atmospheric stabilisation likely to be very costly unless big R&D breakthroughs	Atmospheric stabilisation may be quite cheap as incremental innovations accumulate
Policy instruments and cost distribution	Efficient instrument is government E&D, complemented if necessary by 'externality price' (eg. Pigouvian tax) phased in.	Efficient response may involve stronger initial action, including emission caps / pricing, plus wide mix of instruments, targeted to reoriented industrial R&D and spur market-based innovation in relevant sectors. Potentially with diverse marginal costs
Timing implications	Defer abatement to await technology cost reductions	Accelerate abatement to induce technology cost reductions
'First mover' economics of emissions control	Costs with little benefits	Up-front investment with potentially large benefits
Nature of international spillover / leakage effects arising from emission constraints in leading countries	Spillovers generally negative (positive leakage) due to economic substitution effects in non-participants	Positive spillovers may dominate (leakage negative over time) due to international diffusion of cleaner technologies

Source: adapted from Grubb, Koehler and Anderson (2002)

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CONTROLLING THE COST OF TRANSATLANTIC CLIMATE CHANGE POLICIES*

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– Executive Summary

By minimizing the cost of transatlantic climate policies the United States and Europe can protect their economies and secure the domestic political support necessary to take strong action against global warming. In short, climate policy costs must be (I) modest overall (II) predictable and (III) distributed justly among countries and industrial sectors. Differences between the United States and Europe over the Kyoto Protocol stem partly from different perceptions about how well the treaty achieves these objectives. Any future transatlantic climate change cooperation must do a better job of satisfying the cost concerns of both parties.

– Uncertainty

Our understanding of climate change and the costs or benefits of various policy responses is imperfect. Today's models provide only crude estimates about the economic consequences of alternative global warming scenarios. Judgments about the benefits of climate policies rest on uncertain predictions about the adverse regional effects of global warming. Likewise, estimates about their costs rely on potentially shaky assumptions about the rate of technology change, innovation and social adaptation. With such uncertainty it is no wonder that differences of opinion exist.

* This paper builds on a forthcoming publication by Joseph Aldy, Richard Baron and Ms. Tubiana prepared under the auspices of the Pew Center on Global Climate Change for its 'Beyond Kyoto' series.

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The question for policy makers is how to deal with this uncertainty. Some maintain that uncertainty argues for delaying costly action to spare the economy until more is known. Others argue that the risk of irreversible and possibly catastrophic climate change more than justifies decisive action as an insurance against the unknown. The reasonable middle ground on which most Americans and Europeans agree is that the risk of dangerous climate change is real enough to warrant genuine action now that can be pursued without unduly harming the economy.

Controlling the cost of fighting climate change, therefore, is of critical political, economic and environmental importance. Keeping the cost low is key to securing the broadest possible political acceptance, both at home and abroad. A high cost approach, in addition, would detract from the pursuit of other important priorities, such as health care, job creation, education and national security. Cost-effective climate strategies, moreover, are needed to ensure that any resources devoted to climate policy actually achieve the maximum environmental benefits.

The timeframe required for climate solutions also creates uncertainty. Greenhouse gases stay in the atmosphere for decades (methane), centuries (carbon dioxide), and even millennia (perfluorocarbons). Reducing emissions today imposes an immediate cost on society that would be off set slowly over time by the benefit of less climate change. Because nations and individuals discount future benefits, they are only prepared to pay a modest amount today to avoid a larger cost from climate change tomorrow. Uncertainty how to value benefits over very long periods only amplifies uncertainty about the benefits themselves. This mountain of uncertainty inhibits not only rational decision-making but also political action because convincing voters today to sacrifice for the benefit of future generations can be politically challenging.

– The Cost Framework

Nations tend to concentrate on three important dimensions of the cost problem. These are (I) expected total cost, (II) predictability of cost, and (III) relative cost or ‘competitiveness’.

Each is discussed below.

I. Expected Total Cost

The expected costs of climate policies hinge largely on the stringency of the goals established and the cost-effectiveness of the measures chosen to meet them.

A. *Stringency*

Stringency is a function of the magnitude of the change in national emissions sought and the timeframe in which that change is to be achieved. Ambitious targets may become very much more expensive to achieve than those that are slightly less so because the marginal cost of emissions abatement rises (meaning that achieving the last emissions reduction costs many times more than the first).

Timing too is critical to determining stringency. It should be self-evident that moving ahead too fast would be unduly costly because that would require rapid, unanticipated and expensive changes in capital stock, business practices and personal behavior. Yet, climate policies that focus primarily on very long-term goals (such as creating a carbon-neutral society by 2050) may leave investors guessing whether distant goals would really be pursued or enforced in the future. Giving emitters too much time to reduce emissions without intermediate goals, therefore, can result in under investment in new climate-friendly technologies and practices. This can result in a costly last minute scramble to achieve the original policy objective, making an ambitious very long term objective more costly than a more reasonable medium term plan. Economists agree that to achieve any fixed objective the most cost-conscious climate policies would re-

quire modest action in the short term while establishing clear and credible benchmarks or market signals for medium- and long-term performance. Sound policies would also induce near-term investments in technologies that would inevitably require decades to develop and deploy. Good policies, in short, begin slowly and then escalate to give players time to adjust but not enough time to sit on their hands.

B. *Cost Effectiveness*

The second major factor in determining the expected cost of climate policy is cost effectiveness. Cost-effective climate policies achieve a given stringency objective at the lowest possible cost. Policy makers can promote cost-effective strategies by allowing emitters flexibility on the where, when, what and how of emissions abatement.

- 1) *Where?* Greenhouse gases mix in the atmosphere, so emissions avoided in Boston yield the same benefit to the climate as identical action in Berlin or Beijing. To minimize costs, abatement should occur where it can be done cheapest. Policy mechanisms, such as emissions trading, that harness the power of the free market to identify low cost solutions also contribute to cost effectiveness. Technology investment programs in developing countries, where many emission reductions can be secured most cheaply, may also be cost-effective.
- 2) *When?* Climate change happens over many decades. Modest flexibility in the timing of when nations reduce their emissions can reduce costs without harming the environment. The atmosphere is not sensitive to annual variations in greenhouse gas emissions. Climate policies, therefore, should allow higher emission in times of robust economic growth than during recessions. Nations should average their emission performance over a number of years or use a performance indicator that takes into account changes in economic growth, such as the carbon intensity of the economy (emissions per unit of GDP).

- 3) *What?* Several gases contribute to atmospheric warming. Policies should encourage reductions in atmospheric concentrations that can be achieved most easily, taking into account that each gas contributes to global warming differently.
- 4) *How?* Nations have different energy needs. Some nations may find it cheaper to reduce carbon emissions from the transportation sector while others might find easier progress by focusing on industrial emissions or housing. Some nations may be able to sequester (store) carbon in the land or sea cheaply using plants, algae or other methods. The right mix of policies will vary from country to country based on their unique national circumstances. Accordingly, to be cost effective any international approach must allow nations the flexibility to decide how best to meet any agreed upon objective.

II. Cost Predictability

Another critical factor is the predictability of economic costs. In statistical terms, this is a question of ‘variance’ or the extent to which actual outcomes are likely to differ from expected cost. Cost unpredictability can be as important an obstacle to progress as expected cost. Companies and consumers tend to be risk averse. Accordingly, a climate policy that is reasonably certain to cost one billion euro or dollars annually may be more socially acceptable than another policy that is expected to cost twenty percent less but that also has a substantial risk of ending up at twice the price. So, while predictability does not reduce expected costs, certainty about costs may facilitate the adoption of strong climate policies and help ensure compliance with those policies.

There are a number of ways to increase the cost predictability of climate policies. First, less ambitious policies are more likely to be predictable for the same reason one can more accurately throw a ball five meters than fifty. Second, climate policy costs are more predictable for some approaches than others. Climate policies tend to have either (I)

predictable environmental outcomes but uncertain costs, or (II) predictable costs but uncertain environmental outcomes. The Kyoto Protocol's binding national emissions targets are examples of the former, while energy taxes and technology research programs are forms of the latter. One can, of course, retain the appearance of Kyoto-style targets while providing cost predictability by adding a so-called 'safety valve' to a national target. This mechanism would excuse a nation from reaching a pre-agreed target if the cost of climate action rose more than expected. Another way to increase the predictability of a target might be to index it to economic growth, such as an emissions intensity ratio (emissions per unit of GNP) rather than an absolute emissions goal (such as returning to 2000 emission levels by 2010). Here too predictability about costs would come at the expense of some predictability about environmental benefit.

III. Relative Cost

In political terms, expected cost may prove less important for some parties or industries than the competitiveness consequences of climate policies. Relative cost refers to the distribution of costs both among and within countries, as well as among and within specific industrial sectors. Competitiveness concerns arise when companies from one nation face different climate burdens than their competitors in other nations. Those with lower burdens in effect have a leg up on their competitors. For goods that are traded internationally, relative cost comparisons matter not only among traditional economic competitors, such as the United States and Europe, but also with respect to emerging economic powers, such as China, Mexico, Brazil and India.

Relative cost discrepancies are hard to eliminate because even when a nation as a whole would not suffer a loss in competitiveness, certain of its industries, particularly those that are carbon intensive, may be harmed. Energy-intensive industries producing goods that are traded internationally would seek to avoid the climate policies of one nation by relocating plants or shifting production to countries with less costly regulation. Aluminum, for example, would be particu-

larly vulnerable because it is both energy intensive and a highly competitive industry. The possibility of job loss and industrial migration creates domestic political challenges for nations seeking to address climate change. Relative cost differences among trading partners also produce environmental effects. 'Emissions leakage' occurs when emissions reductions in one place are partly offset by emission increases elsewhere, such as when a plant moves from Europe to China to avoid European carbon regulation. Some economists believe that unless relative costs are equalized across major trading partners emissions leakage could be substantial.

Perhaps the only way to minimize the political, economic and environmental problems surrounding competitiveness shifts would be to ensure that major emitters and economic competitors are undertaking similar efforts to address the climate problem. Coordinated international emissions trading, for example, would act to equalize the marginal cost of carbon emissions and thereby reduce incentives to shift production from one country to the next. Programs designed to engage developing nations to upgrade their technologies may also achieve a similar effect.

Yet, while keeping an eye on relative costs might help minimize competitiveness shifts among trading partners, climate policy will inevitably create winners and losers within particular economies. Even if all nations were pulling together in harmony, carbon-intensive industries and sectors would suffer relative to other areas of the economy. People would use less aluminum and gasoline, for example, if the cost of those products increases relative to low carbon goods. This substitution from high-carbon to low-carbon goods is precisely what the environment requires but the transition would be painful for at least some economic players even if it proved beneficial for society as a whole. Therefore, it will fall to policy makers to redistribute burdens equitably.

– Kyoto's Cost Features

The Kyoto Protocol would have some but not all of the cost control features outlined above. The overall Kyoto target (approximately 5% below 1990 levels by 2008-2012 for industrialized nations) is seen as too modest by many in Europe and as too stringent by many in the United States. In other words, there is a real question as to whether the stringency of Kyoto was set correctly. Kyoto would have many cost-effective features, including international emissions trading, inclusion of all six major greenhouse gases, a multi-year period to control for the boom and bust of the economy, (limited) inclusion of carbon sequestration and the flexibility for countries to secure emission reductions from a variety of sectors. Yet, the Kyoto targets would demand a particular environmental outcome (compliance with the treaty's national targets) but they would leave the cost of compliance uncertain, so Kyoto's true cost would remain unpredictable. Early estimates for the United States, for example, varied by a factor of ten. Kyoto's competitiveness consequences, moreover, were not analyzed systematically during the negotiations and remain unclear even today. As developing nations do not have targets, Kyoto would result in some (perhaps modest) competitiveness benefits for these countries relative to countries with targets. In short, the Kyoto Protocol would make some effort to control the many dimensions of the cost problem but determining the adequacy of that effort remains a highly subjective judgment. Given where nations stand on Kyoto, it is perhaps fair to say that Europeans have been optimists and Americans pessimists on the likely cost of the treaty.

– Controlling Costs Beyond Kyoto

Future transatlantic climate policies should control economic costs and thereby pave the way for strong but affordable action against global warming. By adjusting the magnitude and timing of action the United States and Europe can balance competing economic and environmental concerns. By incorporating flexibility and market mechanisms

needed to make policies cost-effective, strong climate policies can be pursued at the lowest possible cost. By linking up European and American emission trading systems and coordinating other activity, they can reduce the competitiveness concerns of climate policy. The parties' willingness to link their systems may depend on whether the United States and Europe each believe the other is behaving fairly. Both parties would benefit from expanding any linked system to include as many other nations as possible in order to take advantage of other low cost emission reduction opportunities. In addition, by setting realistic goals and targets, or by incorporating mechanisms to enhance cost predictability, such as a safety valve or indexing, the transatlantic parties can reduce economic uncertainty and secure the strongest possible action that would not undermine economic growth.

HOW CAN THE TRANSATLANTIC PARTNERS HELP IN ADDRESSING DEVELOPING COUNTRY EMISSIONS?

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The nature of the climate change problem will demand global co-operation in reducing greenhouse gas emissions over the current century. To the extent that efforts to stabilize atmospheric concentrations are ultimately successful, all major sources of greenhouse gas emissions will have to be addressed. The first section of this note briefly describes the current situation with respect to greenhouse gas emissions in developing countries. The second section summarizes the current political context for future actions. The final section describes specific actions that Europe and the US – despite their differences of views – can take to help address developing country emissions.

– Greenhouse Gas Emissions in Context

If governments are going to address the problem of climate change, addressing developing country emissions, at least over the medium and long term, is a necessary condition for success. Global trends suggest massive future increases in energy use that, in turn, drive CO₂ emissions. According to the International Energy Agency (IEA), primary energy use worldwide is expected to grow 67 percent by 2030, resulting in a 69 percent increase in CO₂ emissions⁴. The U.S. Energy Information Administration (EIA) has developed three global economic scenarios – high growth, reference, and low growth – which imply worldwide emission increases of 31, 59, and 90 percent respectively by 2025⁵. A scenario development exercise led by the Intergovernmental Panel on Climate Change likewise suggests tremendous

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future growth in energy use and emissions, largely dominated by fossil fuels⁶.

In all scenarios, the largest increases in energy use and emissions come from developing countries where over 80 percent of the world's population resides. According to the IEA 'Reference Scenario' (IEA 2002), for example, developing country CO₂ combustion emissions are projected to over take OECD emissions by 2030, and the total emission gap between industrialized and developing countries is projected to *narrow* significantly from 1.9GtC in 2000 (arrow "①" in Fig.1.b) to 0.5GtC (②) in 2030, i.e. to around a quarter of its original size⁷. However, it is also projected that the emission gap between the industrialized and developing countries *increases* over the same period in per capita terms by a quarter from 2.6 (③) to 3.3tC (④). The discrepancy between these two measures of the "North-South emission gap" with their opposing dynamics lie at the heart of some of the key North-South controversies to be discussed in the next section, involving the issues of "environmental effectiveness" and "common but differentiated responsibility". Yet fortunately the two measures are not irreconcilable in their policy implications, as this paper aims to demonstrate.

The rise in developing country emissions is not surprising, given that one-third of the world's population – mainly in developing countries – does not have access to electric power services. Accordingly, many technologies have not widely penetrated developing country economies. As incomes rise and poorer populations increase their access to electric power, the attendant use of consumer goods like refrigerators, air conditioners, and computers put strong upward pressures on greenhouse gas emissions, and will continue to for many decades. This is particularly true in the transportation sector, where rates of motor vehicle ownership are about 100 times higher in the United States than in China, India, and many other developing countries.

6. N. Nakicenovic and R. Swart, eds., *Special Report on Emission Scenarios. A Report of Working Group III of the IPCC* (Cambridge: Cambridge University Press, 2000).

7. Taking into account all greenhouse gases, developing countries in 2000 emitted 48% of global emissions. See Climate Analysis Indicators Tool (CAIT), World Resources Institute, 2003. <http://cait.wri.org>.

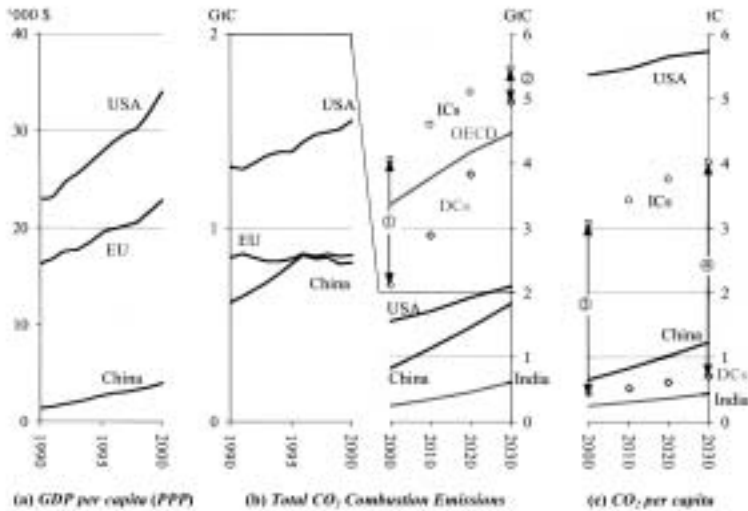


Figure 1: Selected Indicators. Historical (1990-2000) and Projected (2000-30)

'DCs' and 'ICs' = Developing and Industrialised Countries

Sources: CDP (current PPP): Development Data Group, The World Bank, 2002, *World Development Indicators 2002* online; CO₂ (fuel combustion): 1990-2000: IEA, *CO₂ Emissions from Fuel Combustion, 2002 Edition*; 2000-2030: IEA, *World Energy Outlook 2002, 'Reference Scenario'*.

Many factors affect the ability of developing countries to reduce greenhouse gas emissions, particularly the fact that other social and economic priorities such as poverty eradication far outweigh concerns over greenhouse gas emissions. Income levels of an average American, for example, when measured in terms of purchasing power, are nine times higher than that of an average Chinese citizen, and 14 times higher than that of an average Indian (Figure 1.a). Broader social and economic data reveal similar patterns. With more than 1.3 billion people living on less than \$1 per day and an equal number lacking access to safe drinking water, other issues will override – politically and financially – most efforts to control greenhouse gases. Even within the issue of climate change, adapting to the physical impacts of climatic changes is a more salient issue for developing coun-

tries. According to the most recent report of the IPCC, climate change impacts – current and future – will fall disproportionately across countries, with the poorer ones bearing the brunt of the burden.

Despite upward emissions trends, developing countries have already taken meaningful steps to reduce the greenhouse gas intensity of their development paths⁸. For example, although Mexico, India, Thailand, the Philippines, and Indonesia rely on coal and oil for electricity, they have all made national goals (targeted locally) to increase renewable energy and improve energy efficiency. Thailand and Brazil have made comprehensive, successful national efforts at demand-side management. In Argentina, 10 percent of the automobile fleet runs on compressed natural gas. India has implemented natural gas use for heavy vehicles in its major cities and for most of New Delhi's public transport system. Many countries – including Indonesia, and other OPEC nations – are phasing out fossil fuel subsidies. Many of these measures have required leadership and entailed political and economic costs, for which these countries deserve recognition.

Indeed, efforts in China, Brazil, India, Mexico, South Africa, and Turkey alone have reduced emissions over the past three decades by nearly 300 million tons a year. Without these efforts, emissions of these six countries would likely be about 18 percent higher than current levels. According to Chandler *et al.*, “[t]o put these figures in perspective, if all developed countries were to meet the emission targets set by the Kyoto Protocol, they would have to reduce their emissions by an estimated 392 million tons from where they are projected to be in 2010.”⁹

China's accomplishments are especially impressive. The world's most populous country has reduced its greenhouse gas intensity (i.e., emissions per unit of economic output) by 65 percent since 1980 (the US and Europe, by comparison have reduced intensity 35

8. See B. Biagini, ed., *Confronting Climate Change: Economic Priorities and Climate Protection in Developing Nations* (NET and Pelangi, 2000); W.V. Reid and J. Goldemberg, eds., *Promoting Development While Limiting Greenhouse Gas Emissions: Trends and Baselines* (UNDP and WRI, 1999).

9. The figures in this paragraph are from W. Chandler et al., *Climate Change Mitigation in Developing Countries*, Washington DC: Pew Center on Global Climate Change, 2002:p.iii.

percent over that period). Even more impressive is the fact that China's CO₂ emissions, in absolute terms, levelled off or even decreased from 1996 to 2001, despite vigorous economic growth during the same period (Fig. 1.b). China has implemented sweeping energy policy reforms over the last two decades to promote energy efficiency and conservation. Measures taken include reductions in fossil fuel subsidies; research, development and demonstration projects; a national information network with efficiency service and training centres; tax reforms; equipment standards; and special loan programs, among other initiatives. The coordinated, economy-wide Chinese energy has yielded emission savings equal to nearly the entire US transportation sector, about 400 million tons of carbon per year¹⁰.

While these initiatives have unquestionable climate benefits, the scientific evidence suggests that much more will be needed over the coming decades to avoid dangerous climatic changes. The emission trends – driven by population and economic growth – will overwhelm improvements in energy efficiency and modest penetration of renewable energy technologies.

– The Political Context of Addressing Developing Country Emissions

The 1992 UN Framework Convention on Climate Change calls on Parties to “protect the climate system... on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.” More specifically, it calls on the industrialized countries to “take the lead” in protecting the climate. Accordingly, governments agreed that at least the first round of legally binding emissions controls – adopted in the 1997 Kyoto Protocol – should *not* include developing countries. This agreement reflects an understanding that the wealthier countries have greater responsibilities for the problem and greater financial resources and technological capability to put themselves on a sustainable course, and that developing

10. Z. Zhang, “Is China Taking Actions to Limit its Greenhouse Gas Emissions?” in Reid and Goldemberg, *supra*.

countries, on the other hand, face more urgent priorities, such as poverty alleviation and public health.

However, since the adoption of the Kyoto Protocol, a number of industrialized countries have been concerned that current lack of emission control commitments for developing countries translates into a lack of environmental effectiveness for the international climate regime. This concern is due to rising greenhouse gas emissions in poorer countries (described above) as well as the possibility that, if industrialized countries adopt commitments, some energy-intensive industries might migrate to developing countries where growth is unconstrained. While accepting that richer countries must take the largest steps, they have argued that developing countries must take – or at least declare an intention to take – smaller steps.

In the eyes of the developing world, industrialized country demands have lacked credibility. Most developing countries maintain that the richer countries are mainly responsible for precipitating climate change and that they have done little to address a problem largely of their own making. Indeed, many in the developing world have felt that some richer countries are fulfilling neither the letter nor spirit of the 1992 UN Framework Convention on Climate Change, particularly with regard to the affirmed principle that countries act “on the basis of equity and in accordance with their common but differentiated responsibilities and respective capability”.

While still operating in the background, this North-South divide is no longer so perceptible at the intergovernmental level. Rather, a more recent divide between the United States and Europe has, at least temporarily, substituted for some of the long-standing North-South divisions. Currently, Europe is committed to the entry into force and implementation of the 1997 Kyoto Protocol. The United States, on the other hand, has focused on transformative and technological solutions to climate change (e.g., hydrogen development, capture and storage) outside of a multilateral framework. Instead of Kyoto’s targets and timetables, the US has deemed technology-oriented approaches more compatible with US interests in strong economic growth and prosperity.

The US and Europe also differ, at least for the moment, over the future role of developing countries in mitigating climate regime. Currently, the Bush Administration position is aligned with those of many developing country governments, in that neither believe that legally-binding emission limitations or serious action on climate change is warranted from developing countries, where other socio-economic priorities prevail. While the European Union has sought to initiate discussions on future commitments beyond Kyoto's 2008-2012 time-frame, the United States has supported the developing country view that no such talks are warranted, at least in the foreseeable future. Rather than engage multilaterally, the US has employed a primarily bilateral and voluntary approach to cooperation with developing countries.

While the recent negotiations have shown a disagreement between the key developing countries and the EU concerning 'developing country commitments' and an apparent rapprochement with the Bush administration on this issue. The EU position that industrialised countries must take on substantial further cuts in emissions – rejected by the Bush administration – is supported by the large majority of developing countries.

– Actions to Reduce Developing Country Emission Growth

Despite the differences described above, Europe and the US may still be able to find common ground on climate protection. In particular, they have some means at their disposal for helping developing countries slow the rise in their greenhouse gas emissions. Four sample areas are offered for consideration. These four examples share a common thread: they are based on actions that *industrialized countries*, in particular the transatlantic partners, can take to help rein in future emissions in developing countries.

1. *Technology Spill-Over*¹¹

Technology spill-over refers to the North-South diffusion of technology through market forces. The phenomenon is illustrated here with a particularly promising sector, namely, transport. Mitigating transport emissions in developing countries could amount to a significant reduction in their overall greenhouse gas emissions, particularly in light of the large projected emission increases in this sector.

Technology spill-over is already apparent in the transport sector. Most motor vehicles are produced (and sold) in industrialized countries, among a relatively small number of manufacturers. Developing countries tend to rely on either imports or licensed production. For example, almost nine-tenths of the roughly 600,000 passenger cars sold in India during the last financial year were produced domestically. But 85 percent of that domestic production was carried out under license. In short, given the structure of this sector, spill-over can be surprisingly quick, as exemplified in the rapid diffusion of catalytic converter technologies in the US during the 1970.

The key to whether climate-friendly technology spill-over occurs depends on the speedy diffusion of the technology *within industrialized countries*. Once they adopt clean technologies, it might make little sense for global automobile industry to continue producing CO₂ – intensive vehicles for the developing world. Here, there is some cause for optimism. In 2002, the state of California approved a law that will establish the first major greenhouse gas emission standards in the country. Under this law, automakers will be required by the end of the decade to limit greenhouse gas emissions from new cars and light trucks sold in California; such sales account for about 10 percent of total US auto sales. President Bush himself, in his 2003 State of the Union Address, proposed \$1.2 billion in research funding to develop clean, hydrogen-powered automobiles.

Accelerating clean transport technologies – either through regula-

11. This Section is largely based on Benito Müller, *Framing Future Commitments* (OIES, 2003), available at www.OxfordClimatePolicy.org.

tion, R&D, or other measures – would also bring emission and other air quality benefits to developing countries. Until this happens, however, the existing (dirty) technology spill-over will continue to exasperate rather than mitigate developing country emissions.

2. *Technology Transfer*

The Climate Convention and its subsidiary instruments (Kyoto Protocol, Marrakech Accords) put considerable emphasis on the notion of technology transfer, a concept that has taken on a variety of meanings across the North-South divide. Probably the biggest division regards what constitutes “transfer”. In the South, transfers are often interpreted as technology *donations* by the industrialized countries reflecting the differences in ability to pay and/or the difference of responsibility in causing the problem.

In industrialized countries, the prevailing interpretation is essentially that of subsidised technology spill-over, i.e., subsidised *export* of (hopefully) sustainable technologies. This was recently illustrated by the Bush Administration. The highest amount budgeted in the US Climate Change Strategy¹² to be spent in connection with developing countries is \$155m for the United States Agency for International Development (USAID), serving “as a critical vehicle for transferring American energy and sequestration technologies to developing countries to promote sustainable development and minimize their [greenhouse gas] emissions growth”. Clearly, this amount would not buy a lot of technology for transferral to the developing world, but it is not actually intended to. It is to be used to “promote the export of climate-friendly, clean energy technology”¹³.

The Convention and Protocol suggest both interpretations have some validity. In any case, the main instrument for technology transfer under the current international regime is the Global Environment Fa-

12. ‘US Climate Change Strategy: A New Approach’ www.whitehouse.gov/news/releases/2002/02/climate-change.

13. <http://www.whitehouse.gov/news/releases/2001/06/climatechange.pdf>

cility (GEF) with projects such as the recently launched Chinese fuel-cell bus project for trials of fuel-cell buses in Beijing and Shanghai. During the last decade, the GEF approved on average \$270 million financing per annum, a figure which increases to around \$500 million if additional government and implementing agency funds as well as private sector financing are factored in. However, even this figure is dwarfed by the financing of projects in developing country leveraged through another technology transfer instrument, namely export credit and insurance agencies (ECAs), which are discussed below.

3. *Greening Financial Flows*¹⁴

During the 1990s, Export Credit Agencies financing through loans, project guarantees, and investment insurance averaged around \$90 billion per annum, almost twice the average level of official development assistance during the same period. Unlike the GEF, ECAs are financial institutions explicitly created by governments (and funded by taxpayers) to promote exports and facilitate investments in riskier overseas markets. By the end of the last decade, almost a third of all the long-term financing received by developing countries was done under the auspices of ECAs.

In the second half of the 1990s, three-fifths of project and trade finance destined for developing countries (\$216.6 billion out of \$376 billion) supported energy-intensive exports or investments: fossil-fuel power plants, oil and gas development, energy-intensive manufacturing (chemicals, iron and steel, pulp and paper), transportation infrastructure, and aircraft. These projects will result in large quantities of greenhouse gases. It is estimated that thermal power and oil and gas projects in developing countries that received support between 1992 and 1998 from the two US ECAs (OPIC and Ex-Im¹⁵) will release 29.3 billion tons of CO₂ over their lifetimes, an amount roughly equal to global CO₂ emissions in 1996. The two US ECAs provided loans or

14. This section is largely based on Maurer, *The Climate of Export Credit Agencies* (WRI, 2000).

15. Export-Import Bank of the United States and the Overseas Private Investment Corporation.

guarantees for projects worth \$7.7 billion in energy-intensive sectors in India and China between 1994 and 2001. Over this same period, OPIC and Ex-Im have supported projects totalling \$27 billion in the energy-intensive sectors of all developing countries combined.

By comparison, little has been provided to promote renewable or other clean energy technologies. Export credit agencies from *all* industrialized countries (OPIC and Ex-Im included) participated in renewable energy projects worth only \$2 billion during the 1994 to 1999 period. Not all of fossil fuel investment is categorically bad for climate protection, and indeed OPIC and Ex-Im are more environmentally conscious than most of their overseas counterparts. However, the sheer magnitude of the carbon-intensive flows, and the paltry renewables investment, illustrate that taxpayer dollars in industrialized countries are encouraging developing country dependence on fossil fuels and long-term increases in greenhouse gas emissions.

The challenge for industrialized countries-and the transatlantic partners in particular-is to transform ECAs into instruments that promote climate protection in the context of export promotion and economic development. A first step might be to discuss a set of standards and guidelines to assess the greenhouse gas impacts of different investment options¹⁶.

Other public funds also could be used to support clean, climate-friendly economic development, including official development assistance. For example, President Bush's proposed Millennium Challenge Accounts would dramatically increase US foreign aid. If not oriented around broader goals of sustainable development, however, these funds (like ECA funding) could have the effect of further accelerating developing countries' contributions to climate change¹⁷.

16. C. Dasgupta has some reservations concerning this proposal, given (1) the possibility that developing countries might continuing to rely on current (domestically available) technologies that are even less climate friendly than the technologies whose exports are sought to be discouraged and (2) common standards might not be appropriate on account of differing national circumstances.

17. See N. Purvis, *Greening US Foreign Aid through the Millennium Challenge Account* (Brookings, 2003).

4. Purchase of Emission Reduction Credits

It is widely recognized that the primary onus for protecting humanity from adverse climatic change lies with the richer, industrialized countries with their past and current responsibility for the problem and their superior financial resources and technology. Yet, in many cases, the costs of reducing greenhouse gas emissions are substantially less in developing countries. This presents a major opportunity for North-South collaboration on climate change; i.e., for the industrialized countries to pay for emission reductions undertaken in developing countries. This dynamic is recognized in the Kyoto Protocol's Clean Development Mechanism (CDM), which aims to (1) assist developing countries in "achieving sustainable development" and (2) reduce the industrialized countries' costs of achieving their Kyoto targets. The CDM does this by allowing industrialized countries to offset part of their targets with emission reductions "credits" generated from emission-reducing projects in developing countries. In this way, the CDM creates a market for emission reductions, allowing reductions to take place in locations where they are least expensive.

There are at least two critical elements to ensuring that this approach works in practice. First, a mechanism is needed to create the emission reductions credits and ensure they represent real reductions. The CDM, which includes a body of rules and operating procedures, represents one such mechanism. However, the CDM operates pursuant to the Kyoto Protocol¹⁸, to which the US is not a party. Nevertheless, like the EU¹⁹, the US, through its domestic legislative and rulemaking processes, could create an analogous crediting system. Such a system might improve on the current crediting that is permitted under § 1605(b) of the US Energy Policy Act, perhaps borrowing some useful elements of the CDM. Thus, while the CDM represents one approach to crediting emission reductions, other approaches for pur-

18. Strictly speaking, the CDM operates pursuant to the UNFCCC. However, this arrangement is viewed as temporary, considering that the Kyoto Protocol has not yet entered into force.

19. Project-based emission reduction activities in developing countries are currently being integrated in the EU-wide emission trading scheme (itself independent of the Kyoto Protocol ratification).

chasing emission reduction credits from developing countries can be developed.

Second, as with any market, there must be sufficient *demand* for the particular product or service. In this case, a demand for emission reduction credits needs to be created through industrialized country emission limitation commitments. Indeed, there will be a direct correlation between the stringency of emission reduction commitments taken by industrialized countries and the amount of action that takes place in developing countries. If industrialized countries agree to steep domestic reductions, combined with a crediting mechanism described above, there will be a strong incentive for emission reduction activities in developing countries.

For the EU, the targets agreed to through the Kyoto Protocol represent a start in this regard. However, the overall market for emission reductions created by Kyoto is currently hampered by insufficient demand (due largely to the withdrawal of the United States, the largest prospective buyer, and possible surplus supply from Russia). For the US, a domestic emission limitation target (along with a market crediting mechanism) could be created even in the absence of joining Kyoto. Thus, either in the context of Kyoto (as with the EU) or apart from Kyoto (as with the US, at least currently), the industrialized countries can actually promote climate-friendly activities all over the world by committing to do more at home.

This is a potentially powerful dynamic, and perhaps one of the keys to building a successful global strategy to protect the climate. This kind of strategy reduces costs by harnessing market forces, allows private actors to participate, and potentially spurs investment. In the future, the transatlantic partners should consider a strategy of expanding such a crediting mechanism for emission reductions in developing countries²⁰. Such a mechanism could go beyond the “project-based” scope of the CDM. There are at least two additional reasons to expand the CDM.

20. For example, see Samaniego and Figueres “Evolving to a Sector Based Clean Development Mechanism” and Winkler et al. “Sustainable Development Policies and Measures” in Baumert et al. (eds.) *Building on the Kyoto Protocol: Options for Protecting the Climate* (Washington, DC: World Resources Institute, 2002).

First, it is unlikely that a *project-by-project* approach is sufficient to induce the larger transformative shifts needed to genuinely change emission trajectories in developing countries, particularly in the energy sector. This could be remedied if the scope of the CDM were expanded to encompass entire sectors (such as cement or power production) or geographic regions (such as a municipality). Consortia of the host government (local and/or national), private actors, development banks, and other stakeholders might come together to forge large, transformative strategies particularly in advanced developing countries. Such initiatives might include large scale shifts from coal to gas infrastructure in the power or transport sectors, or renewable energy initiatives that might lower some countries' heavy dependence on energy imports.

Second, while improving the cost-effectiveness of the regime, such larger-scale initiatives might also help promote durable and broad-based sustainable development benefits in host countries. A main purpose of the CDM is to help developing countries "achieve sustainable development". However, sustainable development will not be "achieved" on a project-by-project basis. Rather, this will require that countries develop national and sectoral sustainable development strategies. Credit purchases by industrialized countries can help promote such strategies that are consistent with reducing or limiting greenhouse gas emissions growth.

– Conclusions

Over the past few decades, developing countries have undertaken significant measures to reduce their emission growth. These measures have been undertaken in a variety of sectors, including transport and power generation. Nevertheless, if developing countries are going to be successful in their efforts to eradicate poverty and develop their economies, greenhouse gas emissions will need to rise, at least in the short to medium term. How to minimize greenhouse gas growth, while promoting development is a central challenge for the 21st century, and one that the transatlantic partners should seek to address.

While some propose to address this challenge by imposing emission reduction “commitments” on developing countries, there are indeed other viable and more promising strategies. These include technology spill-over and transfers, greening of conventional financial flows, and emission reduction purchases by industrialized countries. These strategies, as well as others, are eminently achievable, particularly if facilitated through transatlantic collaboration and leadership.

RAPPORTEUR'S REPORT

The idea behind the INTACT project, from which this workshop has arisen, has been, from its conception in 2001, that a solution to the climate problem ultimately requires cooperation between the United States and Europe, in spite of the major differences regarding the actual strategy of both actors. There are certainly additional conditions necessary for a successful treatment of this problem - in particular, an intensive dialogue with the South, which is especially difficult due to several asymmetries, including that of who caused the problem and who will suffer most as a result. However, without a core consensus between Europe and the United States there seems to be no opportunity for an effective agreement with the South either. Europe and the United States have to join forces in order to develop technological solutions, implement cost-effective instruments such as the so-called "flexible mechanisms", and ultimately realize a structural change in the energy production system that began as early as 1974, after the first oil crisis.

Fortunately, in spite of recent transatlantic divides on a whole array of global issues by far exceeding in number the differences on climate change, neither side has lost its interest in discussing these differences. This general inclination to return to closer transatlantic cooperation was visible within all topics discussed.

– The Long-term Challenge of Climate Change

One of the major topics discussed at the meeting was the question of how to define a long-term target to limit human interference with the climate system, and whether such a target is necessary to really manage the problem. Initially, to some participants, it was difficult to imagine that drawing the long-term picture makes it easier to over-

* This report has been produced by Alexander Ochs, SWP.

Despite the fact that there was a widespread sense of agreement, any attempt to summarize the major outcomes of the conference in a well-balanced fashion is an amalgamative procedure. Consequently, the opinions expressed in this report do not necessarily represent those of the individual participants.

come the current stalemate in the international negotiation process. It could, they fear, just as easily block it, whereas it might be easier to progress if the goals are short-term and straightforward. For example, one could imagine seeking agreement amongst major emitting countries on a fixed share of emission-free energy production. An initiative towards this goal will be carried forward with the organization of the Intergovernmental Conference on Renewable Energy scheduled for June 2004 in Bonn.

However, there was also absolute consensus that *any* short-term initiative could only be a first stepping stone, but is not the final solution to the tremendous long-term problem. This begs the question as to whether a long-term target is a “nice-to-have” or a “must-have” instrument. It was mentioned that the idea of dealing with the problem by defining a long-term target for absolute emissions concentration in the atmosphere is by no means a new one - indeed it reaches back to the mid-1970s. Nevertheless, an identification of exactly where this long-term objective of climate policy is to be set is missing in the current United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto approaches.

A majority of discussants considered a globally accepted worldwide emissions target as a desirable and politically powerful tool. Such a target could lead policy makers in finding the right regulatory design coupled with a longer time period. Sound procedures could then be implemented to gradually lead to a change of the energy path. The basic challenge was perceived as finding the right balance between immediate measures (to reach certain short-term targets) and a long-term framework.

It was stressed that a long-term target should not prevent and cannot substitute for short-term action. As a next step, a mid-term scheme dealing with the time period until 2020 or 2030 could be established. European politics, it was pointed out, is already elaborating on what can be achieved until then. Both the United Kingdom and France have recently formulated their goals within this time frame. The United States seems to be among those countries more hesitant to do so.

The current administration has set its policy strategy until 2012. The US President announced a re-evaluation at the end of this period. Until then, the US strategy clearly is to support technological investment as opposed to mandatory national regulation or binding international targets.

A long-term framework would not only give planing security to politics but also to industry for the enormous investments that would be necessary, since the general direction of where we have to go in this century would therewith be clear. This would be the strongest possible signal to markets. Accordingly, the participating industry representatives reiterated that the importance of a clear, long term policy would enable them to make decisions regarding certain projects *today*. They are prepared to invest in changing their current practices, provided that policy exists such that this may be done effectively, competitively and equitably. Also, they reinforced the position taken at earlier meetings that they do not want to have to deal in two different arenas, one on each side of the Atlantic. This is an important reason why they support an initiative such as INTACT: they want agreement in the transatlantic field.

So how could a global long-term target be established? To protect the climate from "dangerous" human interference is a target formulated in Article 2 of the UNFCCC. The convention is supported by both the United States and Europe, and in total by more than 180 states world-wide, but would be difficult to establish on a global basis within the near future. Exactly because of this situation, most agreed that the dialogue about it must begin now.

For some participants the numerical definition of what constitutes a "dangerous" concentration level of greenhouse gases in the atmosphere was anything but a prerequisite for a truly global solution of the problem. They argue for a long-term cap of emissions mainly because of two reasons. The first one is physical, namely the persistence of the problem given that the response time of the atmosphere is at least decades. The second is that human learning of how to deal with the problem is a very slow process. The science about the range and

effects of climate change has to improve, the political strategies have to be found and the technology developed. Short-term perspectives, they argue, do not tell us where we ultimately have to go.

Other participants stressed the difficulty of precisely defining which absolute atmospheric emission level is “dangerous”. The International Panel on Climate Change has looked at that question for quite some time, and there is going to be more consideration in its upcoming fourth assessment report. Truly, what can be expected from science is a better understanding of probable effects of certain concentration levels. However, what cannot be expected is the judgement by a scientific panel alone whether this is dangerous – in the end, “dangerous” is as such not a scientific term. Science is only one end of the discussion, while politics has to link these results to social and economic systems. In the end, it is politicians who have to decide what is “dangerous” for our societies.

Ultimately, there was general agreement that it is preferable to exclude this topic from the actual UNFCCC negotiation process and instead create the right context for negotiations first in informal dialogues such as the INTACT project. The advantage is that this issue can be discussed outside the Kyoto framework or within a “Kyoto II” framework focussing on the time beyond its first commitment period (2012). There was wide consensus that agreement on such a longer time period approach would not necessarily require a commitment to “Kyoto I”. In addition, it was noted that a long-term target would not have to be “set in stone”. It could be adapted if new science becomes available.

To everyone present it was obvious that, apart from a numerical fixation of an absolute emissions level, the long-term goal of climate policy is clear: If we want to stabilize global concentrations at any level, we have to decarbonize the economy.

– Technology or Regulation?

The participants spent a great amount of time dealing with the question of how to promote technological progress to mitigate climate change and whether mandatory emissions targets or technology was the solution to the problem. It became clear that for the current US administration, technology is the right and only direction in which to proceed. Significantly, European politicians do not at all contest this general US assessment that only technological change can solve the problem. Rather, the question is how to implement this change. This seems to be exactly where American and European officials are not of the same opinion. Thus the contentious issue is whether, in *addition* to publicly financed subsidiaries and tax exemptions for research and development of clean technological options, there is a need for more severe market penetration to accelerate innovation and prioritize new climate-friendly products. In general, there can of course be no doubt that this would effectively generate the heavy investments on behalf of private actors which will be indispensable in order to realize this substantial change in our economies. The question is rather whether such regulation comes at too high a price for our societies.

A clear majority of participants agreed that neither subsidies nor regulations alone are sufficient. To the contrary, it seemed obvious to most that the idea of a choice between a target-based regime or a technology-based policy is a false dichotomy. Investing in technology would not work efficiently enough if there is not a joint target which justifies these investments. One participant gave the United Kingdom as an example, where “climate policies are driven by the national emission reduction target that has to be met, and this signal is clear and understood by the companies.” As a result, the national policy target drives the market and companies are assured that they have a marketplace in which to sell their technologies. The clear signal to the UK companies would therefore be simple: the price of carbon will gradually rise over the turn of the next decades; thus carbon-intense practices and products will be an expensive option in the future.

There was little doubt among attendants that technology programs

can vastly improve the acceptability and implementability of politically administered reduction targets. One participant pointed out, however, that there are only two fields in which governments were in the “driving seat” and successfully fostered technological change: military and space technology. In these fields, however, there is an enormous incentive: the international contest to top the potential enemy. This, however, would not be the case in international climate policy, at least not until there is an international regime that establishes rules for a competition for becoming the least-polluting economy.

The question then arose whether the Kyoto Protocol would be the appropriate playing field for such a fair competition. To most European participants, certain elements of the Kyoto protocol, such as the market mechanisms it establishes, make it clear that we have to move beyond command and control policies. To them, Kyoto provides the opportunity to face the challenge of linking targets and market-based mechanisms.

Since an agreement on supporting the Kyoto Protocol is neither in sight within the US government nor a majority of the US Congress, the question is where else technology progress on a transatlantic basis can be made. One area in which Europe can learn from the United States is their electronic appliances efficiency. The US standard in this market segment is far higher than it is in Europe. Efficiency gains in general were considered to be a great opportunity for transatlantic collaboration.

The idea was then carried forward to establish a transatlantic network for sharing best practices and experiences on how to best introduce new, cleaner technology to the market. This could also lead to massive joint investments in human capacity building. The International Energy Agency (IEA) and other institutions could lead efforts in these directions. They have gathered extensive information on the value of particular actions which could serve as a basis for a best-practices exchange.

One participant received widespread agreement on her conclusion that “[w]hat we need is leadership, leadership both from states and

from industry – agents for change *and* technology. We have to give these agents for change a marketplace where they can be successful.”

– Minimizing the Economic Costs of a Climate Strategy

On each side of the Atlantic, there is undoubtedly a very different assessment of what the achievement of certain emissions targets would cost. There was unanimous agreement at the meeting that it would be wise for Americans and Europeans to sit together and talk about costs. To do so, the idea of founding a joint task force on the costs of climate policy received great support from all sides.

It was mentioned that in the United States, a majority of Congress and the American people believe that there is an ironclad law linking fossil fuel combustion and economic prosperity. The idea was that stronger political will would be necessary to change this fundamental misunderstanding. To be fair, it was also noted that once America makes a decision, the follow-through to action is more swift than it would be in Europe. Thus, most consented that America might benefit from international assistance in mobilizing its political will. One possible strategy is scenario work, in which possible futures are scrutinized to determine which is the most favorable. Then, the backward process is mapped out such that the actions necessary at present are visible.

The lack of awareness – of both the seriousness of the problem and the amount of resources necessary for change – is by no means unique to Americans alone. As one European participant said, “most of our public and decision makers still consider climate change as a problem of pollution only, but this is not in qualitative relation to the scale and complexity of the issue. More realistically, the challenge is one of fundamentally reorganizing our mobility and the way we use energy. This requires a substantial degree of effort, one commensurate to the scale of the problem – one which is not visible at present.”

Though this position was widely agreed upon, one participant doubted that a change of our production methods was really as expensive as often mentioned. He added that there has already been a number of important transatlantic companies who have successfully

reduced their emissions. The overall experience was that these investments of course did cost. However, costs were greatly overshadowed by the money that was saved afterwards because of those investments, not to mention the economic impact of a green labeling amongst consumers.

It should be stated that all participants of the Villa Vigoni dialogue were taking part in the event since they understood the general strategic context and the urgency of the issue at hand. In that sense, the presented party was a “coalition of the willing”, and the topic might have been discussed very differently if other stakeholders would have been present. Thus, the question arose as to how that basic assessment could be agreed upon by others, that is how a wider constituency could be won over. Basically, there is a need for significant investment from both public and private sectors into timely solutions. Also, future discussions would have to refer to whether what they are suggesting is capable of expanding the constituency and the pressure for investment at that level. For this to happen, the financial community which at present does not seem to understand the severity of the problem and its implications for itself must be engaged.

It seems as though there are two general but rather extreme positions in our societies today. For some, climate change is an urgent danger, and technological change would be rather cheap. For others, climate change is not so urgent, and since we do not have the technologies for substantial change at hand, we should wait with regulatory measures in order to implement this change. However, it was mentioned that this “uncertainty” observed in the field of climate change is *not* a unique challenge for policy making. To the contrary, political decisions mostly have to be made with some level of uncertainty because we never know exactly how the future will unfold. An illustrative example is the hundreds of billions in dollars which were spent on both sides of the “iron curtain” during the cold war on defending against each other. Fortunately, the weapons that were developed were never employed against the enemy.

Although it is important to have impact assessment, the group

agreed that this should include not only the cost of mitigation but also the benefits of avoided impacts. The costs for adaptation to climate change will increase dramatically in the near future if no action is done to prevent it at present. One participant pointed out that already today, experts advise Europe to put at least ten billion euros per year into climate change adaptation measures. This number does not even include the funds necessary for the increasing costs of health care which will arise from climate change.

Again, it was emphasized to tackle the problem on a transatlantic basis and on a global level. European companies will experience difficulties meeting emissions targets which do not exist for US companies without competitive losses. Similarly, both European and American industries have to compete with firms in China, South Africa or Brazil. It was therefore considered sub-optimal that Europe, Japan, or Canada are bound by Kyoto's reduction targets in the first assessment period while other economies are not. However, now that they are committed they have to lead the process and establish the necessary instruments for effectively reducing emissions. There was widespread agreement that these actors have to demonstrate that it is possible to reach strict climate policy targets without destructive effects for their national economies. This proof would be more effective than most political enterprises.

– In Search of Cooperation with Developing Countries

The discussion over how to involve the transatlantic partners with major developing countries on climate change began with one participant expressing frustration towards how little is done to promote climate policy cooperation on the North-South basis. For example, less than 5% of the European Union's foreign aid budget goes towards energy infrastructure development, and only a small proportion of that towards sustainable energy production. Regarding the Global Environment Facility, one discussant claimed that it has distributed about 250 million US dollars in support of green energy – but over almost an entire decade. He added, "if you put the GEF budget for

clean technology transfer against the World Bank budget for the development of conventional technology, the result is a huge credibility gap of how serious the North really takes the problem. We should not just talk about the dramatic revolution that is needed, but really work together and invest in a constant evolution and distribution of technologies.”

The same holds true for the export credit agencies (ECAs) on both sides of the Atlantic. Regrettably, the American and European ECAs have supported conventional energy projects on a much larger scale than they have done with renewables, even within the last decade in which climate change has been a prominent topic. It should be stated that in this specific field the United States has been much more progressive and implemented stronger environmental rules for its ECAs than Europe. One participant even pointed out that the OECD dialogue on a reform of the ECAs has more or less ceased because the Europeans would not come along. It was finally widely agreed that if the ECAs were directed more toward energy efficiency and alternative energy and not only toward traditional conventional fuels, it would make a great difference.

Can the emissions trading system be broadened to cover both North and South? There was high consensus that the greatest impediment to the inclusion of the South was the lack of involvement by the United States, and as such the latter is the most important player to be brought back into the game. A win-win strategy would be one which engages developing countries in a way that protects their economic development, but at the same time facilitates the involvement of the EU and the United States. However, the development of this truly global approach will take time and more practical, short-term solutions should be sought until then, such as investing in energy and transportation infrastructure in the South.

The issue for developing countries is not the desire to moderate their greenhouse gas emissions, but rather who assumes the arising costs. The Framework Convention is quite clear on this matter: Developing countries act under the provision that the incremental costs are

met by the Annex II countries. The Clean Development Mechanism (CDM) established by the Kyoto Protocol is for many participants part of the answer. In light of this instrument, developing countries already *are* part of the international regime to combat climate change. The EU currently drafts the so-called Linking Directive which is an amendment to the Emissions Trading Directive. It will put forward the possibility for private companies to generate credits in countries outside their own countries including developing countries. This new instrument, however, will not be implemented before 2008.

Apart from the importance of technology and finance transfers from the North to the South, one participant suggested to the consensus of most others that the best that the United States and Europe can do for developing countries is to take national action themselves, as that would establish the appropriate role models. There needs to be discussion amongst wider constituencies regarding how Europe and the United States could figure as leaders.

– European and US Challenges

It was agreed that, at least in terms of organization and institutions, domestic action in the European Union is significant. One participant mentioned the positive effect of the liberalization of the electricity market in Europe, allowing third-party access. Facing new regulations, this led to the involvement of renewable energy companies filling in this niche of the market. As a result, larger energy and electricity suppliers have taken an interest in the renewable market too, increasing the size of the European renewables market. There is hope that the idea of Green Certificates will further advance the renewables market in Europe, and even facilitate its extension beyond EU borders. Green Certificates would provide a powerful incentive to industry to take action against climate change.

One main hindrance of stronger domestic action in the EU is the loose climate policy framework with little integration of the Member States. Although the Member States are bound together by the Kyoto protocol, they are not willing to forgo more of their sovereignty. Thus,

it is difficult for Brussels to initiate the energy policies necessary in terms of efficiency and renewables.

Accordingly, international action by the EU is achieved through the development cooperation programs of the Member States, as these programs are not a Community competence. However, within these programs much activity concerning developing countries is taking place. This includes discussing the establishment of baselines for CDMs, capacity building and technology transfer. Sustainable development is the primary objective of these policies, whereas climate concern is of secondary importance. The issues addressed are comparable with those within the European Climate Change Program, where the details within each sector are explored with the intention of determining what can be achieved and how much it would cost.

In addition to addressing these weaknesses, the biggest challenge for the EU was seen as fulfilling its international and internal commitments as well as demonstrating to the United States and others that this can be done affordably, in order to ease cost concerns that appear to be prominent on both sides of the Atlantic.

Regarding the United States, one participant asserted that although the Science and Technology Program as well as the network-building through the national registry program are impressive, there does not appear to be any significant commitment within the United States to reduce emissions domestically as a result of an international strategy. The estimate is that over the 2002 to 2012 time period, emissions will be reduced by 18% under the Bush Administration's plan compared to 14% in a business-as-usual scenario. This gain was regarded by most participants as insufficient. Within the United States, according to an American participant, is a great need for the domestic debate to mature and reach consensus. Only then could the United States meaningfully enter a discussion over what the next international steps should be.

Internationally, the United States has signed a number of bilateral agreements. There is significant attention paid towards science and technology and creating the foundation for building capacity and un-

derstanding of sinks, as well as considerable activity in research and development. However, there is little to be said about emissions reductions under these bilateral agreements. Funding committed to international activity in the field of climate change is low as compared to other fields of cooperation.

The main idea was that if the United States wants to adopt a global approach, and wants more action on behalf of developing countries, they should first take further action themselves. As a start, it was suggested that it would be useful for the United States to quantify the results of its climate change policies which they are developing at present. Also, in the forthcoming US G8 presidency, the United States could initiate an impulse of investment of new money.

– Transatlantic Climate Policy Recommendations

While officials in the United States and Europe continue to disagree on particular aspects of climate change policy, participants left the Villa Vigoni Dialogue with the feeling that the transatlantic gap is not as great as previously assumed, and can be narrowed further. An overwhelming majority within the group agreed that climate change warrants the adoption of strong but economically sensible policies that go well beyond those already in place. Because of the high risks that climate change presents to the environment in general and to human civilization in particular, the topic urgently requires a further upgrade on the international political agenda. There is widespread agreement among experts that the importance of the transatlantic community cooperating towards this aim can hardly be overestimated. Clearly, this truly global problem cannot be solved by either of these traditional partners alone.

The meeting also demonstrated that while international cooperation is critical, currently the most important contribution the United States and Europe could make to globally combat climate change would be to enact strong new domestic measures, possibly including mandatory national emission abatement goals. Exchanging best-practice experiences could help both sides in further developing their pro-

grams. This holds especially true for energy efficiency gains and the mechanism of green certificates.

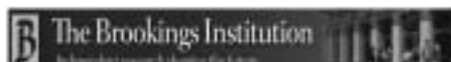
The gathering also showed that more technology research and development efforts are indispensable, as is the installation of new diffusion policies. Therefore, the United States and Europe should collaborate on creating an international market in emission reduction opportunities. Other international players should be invited to join these efforts.

Another important topic worthy of further development is the installation of joint task forces to clarify pressing open questions. One focus should be the cost dispute. It is in the clear interest of both transatlantic partners to clarify how much the attainment of certain reduction goals will really cost. In addition, the United States and Europe should develop joint emission reduction scenarios for the course of the entire century.

With regards to developing countries, Europe and the United States should first create new and massive renewable energy development funds. At a later stage, once both entities have adopted mandatory emission caps, developing countries should be welcomed to establish their own emission targets. These would not necessarily have to be binding. Nevertheless, developing countries with emissions below their targets could be granted the opportunity to sell emission credits to other nations.

The Villa Vigoni meeting has developed the intellectual ground for a follow-up high-level policy meeting in the spring of 2004 in Washington, DC. This forum will be organized for members of the US Congress, European parliamentarians, and other leading politicians as well as decision-makers from the private sector. In Washington, we will continue with an idea developed at the Villa Vigoni: to seek the establishment of a very small number of core principles and concrete policy recommendations for future transatlantic cooperation on climate change. Our aim will be to define the most salient, mutually acceptable points on the most important issues and test the level of consensus with the distinguished audience at the meeting.

APPENDIX



SWP

High-Level Transatlantic Dialogue on Climate Change

Villa Vigoni, Laveno Meneggio, Italy, October 16-18, 2003

August 11, 2003

We write to personally invite you to help lead an informal high-level transatlantic exchange on the foreign policy challenge of global climate change. The dialogue will occur October 16 - 18, 2003, in the relaxed setting of the magnificent Villa Vigoni on the shores of Lake Como, Italy.

Climate change may prove to be one of the biggest environmental, economic and energy security challenges of the 21st century. Regrettably, it has already become an important sticking point in the transatlantic foreign policy relationship. The German Institute for International and Security Affairs (SWP) and The Brookings Institution, with the support of the German Marshall Fund of the United States, are convening this informal high-level foreign policy dialogue to bring together distinguished public and private sector leaders from both sides of the Atlantic to bridge the transatlantic divide. Invitees (see attached) will include major political leaders, policymakers, business executives and members of the foreign policy community, as well as leading experts on climate and energy policy. Discussions will be organized around key topics such as: 'Defining Long-Term Climate Change Policy Goals', 'Promoting Clean Technologies', 'The Cost of Climate Policies', and 'Working with Developing Countries.' Each of these topics will be introduced briefly by well known climate and energy experts but the discussions will be moderated by experienced policy makers and business leaders with a view to developing politically realistic solutions. The strong participation of politicians and business executives will distinguish this meeting from routine conferences geared towards academic and technical experts. A draft agenda is attached for your review. The SWP is prepared to cover all reasonable travel expenses upon request. Information about logistics will be provided shortly. See www.villavigoni.it for more information about the beautiful conference location.

We are confident that this informal event will help develop common ground and strengthen the transatlantic relationship. Please RSVP by August 25, 2003 or contact our colleagues, Nigel Purvis (Brookings) at (+1 202) 797-2496, NIPURV15@brookings.edu or Alexander Ochs (SWP) at (+49 30) 88007-234, alexander.ochs@swp-berlin.org for additional information.

Sincerely yours,

James Steinberg
Director, Foreign Policy Studies
The Brookings Institution

Christoph Bertram
Director
Stiftung Wissenschaft und Politik



More information on the
SWP's project can be
found online at:
www.intact-berlin.org

* The German Institute for International and Security Affairs (SWP) receives project international relations to enhance climate change (SWP-ICCT) at the beginning of 2003. From its inception, SWP-ICCT has been supported by a grant from the German Marshall Fund of the United States (GMF). SWP's decision to promote the exchange of views and cooperation between the United States and Europe is thought of the Marshall Plan.

AGENDA

October 16

5 p.m.

Welcome

Aldo Venturelli, Director, Villa Vigoni

Address on behalf of the European Presidency

Corrado Clini, Italian Ministry of the Environment

Introduction of Project and Workshop Strategy

Friedemann Müller, SWP

Nigel Purvis, The Brookings Institution

TRANSATLANTIC FOREIGN POLICY AND CLIMATE CHANGE

Speaker: Anders Wijkman, Member of the European Parliament

Discussion chaired by Carlo Jaeger, Head Dept. Global Change & Social Systems, Potsdam Institute for Climate Impact Research (PIK)

7:30 p.m.

Dinner

Key-note address by Alexander Holst, Vice President Group Sustainable Development and HSE, Shell International B.V.

October 17

8:00 - 9:00

Breakfast

9:00 - 10:30

LONG-TERM TARGET

Chaired by Fabrizio d'Adda, Senior Vice President, ENI S.p.a., Italy

Introduced by

Michael Oppenheimer, Princeton University; and

Friedemann Müller, SWP

10:30 - 11:00

Coffee break

11:00 - 12:30

TECHNOLOGIES

Chaired by Chris Mottershead, Distinguished Advisor, BP

Introduced by

Michael Grubb, Imperial College and UK Carbon Fund; and

Richard Stewart, New York University

12:30

Luncheon

Agenda

- 2:00 - 3:30 p.m. **ECONOMIC COSTS OF CLIMATE POLICIES**
Chaired by Kevin Fay, Executive Director, International Climate Change Partnership (ICCP)

Introduced by
Nigel Purvis, Brookings Institution; and
Laurence Tubiana, Institut du Développement Durable et des Relations Internationales
- 3:30 - 4:15 p.m. **Tea in the Park and Photo Session**
- 4:15 - 5:45 p.m. **DEVELOPING COUNTRIES ISSUES**
Chaired by Baroness Emma Nicholson of Winterbourne, Member of European Parliament

Introduced by
Kevin Baumert, World Resources Institute; and
Ambassador Chandrashekhara Dasgupta, The Energy and Resources Institute (TERI); and
Benito Mueller, Oxford Institute for Energy Studies and Royal Institute for International Affairs
- 6:30 p.m. **Lake Como Cruise to Bellagio**
- 7:30 p.m. **Dinner at Villa Serbelloni on invitation of the Italian Ministry of the Environment**
Key-note address by Umberto Giovine, Chairman, Navigate Consortium/GMES Group, Italy

October 18

- 8:00 - 9:00 **Breakfast**
- 9:00 - 10:00 **REVIEW OF RECENT ACTION IN EU AND US CLIMATE POLICY**
Chaired by Rafe Pomerance, Chairman, The Climate Policy Center

Introduced by Short Presentations
EUROPEAN UNION
Arthur Runge-Metzger, EU Commission

UNITED STATES ADMINISTRATION
Harlan Watson, State Department

10:00 - 11:00

THE FUTURE OF CLIMATE COOPERATION

Chaired by Christoph Bertram, Director, SWP

Introduced by Short Presentations

BEYOND KYOTO: ADVANCING THE INTERNATIONAL EFFORT
AGAINST CLIMATE CHANGE

Elliot Diring, PEW Center

BEYOND KYOTO: WHAT WE HAVE LEARNED

Cedric Philibert, International Energy Agency

11:00 - 11:15

Closing, End of Formal Program **

Additional Program

12:00

Luncheon and Bus Transfer to Cadenabbia

1:30 - 3:00 p.m.

FUTURE PRIORITIES ON THE TRANSATLANTIC AGENDA

Informal exchange with senior-ranking British and German Parliamentarians at the Konrad Adenauer Foundation's Villa Collina in Cadenabbia, Lake Como

Moderator: Christoph Bertram, SWP

Following

Tour of Lake Como Villas, Villa Carlotta

7:30 p.m.

Dinner at Villa Vigoni

9:00 p.m.

Chamber Concert

October 19

8:00 - 10:00

Breakfast and Departure

*** allows enough time to catch the last flight to the US*

LIST OF PARTICIPANTS

John Ashton	Director for Strategic Partnerships, Lead International
Kevin Baumert	Senior Associate, World Resources Institute
Christoph Bertram	Director, German Institute for Inter- national and Security Affairs (SWP)
Chris Boyd	Chair of IETA International Emission Trading Association and Lafarge
Corrado Clini	Italian Ministry of the Environment, Rome
Fabrizio d'Adda	Senior Vice President, ENI S.p.a.
Ambassador Shekhar Dasgupta	Distinguished Fellow, The Energy and Resources Institute (TERI)
Elliot Diringer	Director International Strategies, Pew Center on Global Climate Change
Kevin Fay	Executive Director, International Cli- mate Change Partnership (ICCP)
Joseph Fitchett	Director, Special Projects, World Nuclear Association
Umberto Giovine	Chairman, Navigate Consortium/ GMES Group
Michael Grubb	Associated Director of Policy, U.K. Carbon Trust
Sarah Hendry	Department for the Environment, Food and Rural Affairs, London
Corinna Hoerst	Program Associate, German Mar- shall Fund of the United States
Alexander Holst	Vice President Group Sustainable Development and HSE, Shell Inter- national B.V.

Appendix

Carlo Jaeger	Head Dept. Global Change & Social Systems, Potsdam Institute for Climate Impact Research (PIK)
Chris Mottershead	Distinguished Advisor, BP
Benito Müller	Senior Research Fellow, Oxford Institute for Energy Studies
Friedemann Müller	Senior Fellow, INTACT Project Director, German Institute for International and Security Affairs (SWP)
Baroness Emma Nicholson of Winterbourne	Member of the European Parliament
Alexander Ochs	INTACT Project Manager, German Institute for International and Security Affairs (SWP)
Michael Oppenheimer	Professor of Geosciences and International Affairs, Princeton University
Cedric Philibert	Administrator, International Energy Agency
Rafe Pomerance	Chairman, Climate Policy Center
Nigel Purvis	Scholar and Project Director, Environment and Development Initiative, The Brookings Institution
Artur Runge-Metzger	Head of Climate Change and Energy Unit, Directorate General Environment, EU Commission, Brussels
Karsten Sach	Head of Division, International Cooperation, Global Conventions, International Climate Change, Federal Ministry for the Environment, Nature, Conservation and Nuclear Safety, Berlin

List of Participants

Dick Stewart	Professor and Director, Center on Environmental and Land Use Law, New York University School of Law
Laurence Tubiana	Institut du Développement Durable et des Relations Internationales, Paris
Aldo Venturelli	Director, Villa Vigoni
Gloria Visconti	Italian Ministry of the Environment, Rome
Harlan Watson	Senior Climate Negotiator and Special Representative, State Department
Anders Wijkman	Member of the European Parliament
<i>Conference Secretariat</i>	
Carina Bachofen	Project Assistant, German Institute for International and Security Affairs (SWP)
Federica Barili	
Simona Della Torre	
Nicoletta Redaelli	
Francesca Salvadé	Villa Vigoni

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