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Building a Foundation for Transatlantic Climate Policy

Fourth Transatlantic Dialogue on Climate Change

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PREFACE

This publication builds on the results of the Fourth Transatlantic Dialogue on Climate Change, a policy workshop held by the International Network To Advance Climate Talks (INTACT) at the Villa Vigoni in Loveno di Menaggio, Italy, from 19-21 November 2004 with generous financial support from the Italian Ministry for the Environment. The workshop was attended by leading experts on foreign, energy, and climate policy in government, industry and academia from the United States and Europe. The Fourth Transatlantic Dialogue on Climate Change is part of a series of events organized through INTACT with the goal of developing common transatlantic approaches to the global challenge of climate change and laying the groundwork for future climate policy.

INTACT was initiated in 2001 as a project of the German Institute for International and Security Policy (SWP) with financial support from the German Marshall Fund of the United States. INTACT has since then established itself as a leading forum in the transatlantic climate policy debate. By demonstrating the political and economic feasibility of effective climate policy, INTACT seeks to raise awareness and reshape perceptions about climate policy among key decisionmakers and the broader public. Since January 2005, INTACT has been supported by a generous grant from the Robert Bosch Stiftung. Individual event sponsorship has also been provided by the Italian Ministry for the Environment, EnBW, and Deutsche Telekom.

The Fourth Transatlantic Dialogue on Climate Change was opened with a review of key developments and events during the 2004-2005 period. A discussion on the potential impact of these developments and events was followed by four thematic sessions on the most salient issues in current climate policy. The first session explored promising technological solutions to climate change and approaches to technology development and diffusion. The second session dealt with green-

house gas emissions pathways based on differing transatlantic threat perceptions and strategic approaches. The third session was devoted to energy security, its links to climate policy, and diverging understandings of the concept in the United States and Europe. During the fourth session, participants discussed options for negotiating and coordinating climate policy.

In spite of the divergence of US and European strategies to address the issue of climate change, participants agreed that only a common transatlantic strategy can lead to a lasting solution. Ultimately, they remained optimistic about the prospects of finding common ground between interests and strategies of the United States and Europe. However, they cautioned that effective climate policy can only be built on a solid political foundation and recommended that special emphasis be put on "reframing" the climate policy debate. To this end, INTACT will continue to pursue its goal of establishing a broader and more informed dialog on approaches to combat climate change.

INTACT is deeply indebted to the sponsors of the Fourth Transatlantic Dialogue on Climate Change and to the staff of the Centro Italo-Tedesco Villa Vigoni for their support, without which this event would not have been possible.

Friedemann Müller and Alex Riechel, Berlin, 1 April 2005

EVENT OVERVIEW

Alex Riechel[1]

Introduction

The aim of the Fourth Transatlantic Dialogue on Climate Change was to examine the opportunities for transatlantic climate policy resulting from three cornerstone events during the 2004-2005 period: the 2004 US Presidential elections, the 2005 G-8 Summit and the Eleventh Conference of the Parties to the UNFCCC (COP-11). Additionally, climate policy was considered from the standpoint of technology development and diffusion, greenhouse gas emissions scenarios, energy security, and international policy negotiation and coordination.

The 2004 US Presidential elections and the future of US climate policy

Though the US Presidential elections at the beginning of November 2004 did not bring about a change in the White House, a shift in US climate policy during President George W. Bush's second term in office is not unthinkable. To date, the Bush Administration has focused mainly on voluntary action and massive government spending on certain energy technologies and the further study of climate change, an approach that one participant termed "process-oriented" rather than "end-oriented." Consequently, an apparent starting point for further cooperation between the United States and Europe would be in technology development and commercialization, an approach favored by the government of British Prime Minister Tony Blair and a number of other European governments.

Contrary to popular perception, the Bush Administration has also set emissions targets for the United States, pledging to reduce greenhouse gas intensity by 18 percent by 2012. However, since the Bush Administration defines greenhouse gas intensity as the ratio of emis-

1. Project manager, International Network To Advance Climate Talks (INTACT).

sions to units of GDP, it is likely that total emissions will rise, since the target intensity is lower than projected economic growth. The definition espoused by the Bush Administration has also been widely rejected by developing countries, many of whom favor per capita targets.

European governments, in particular, have demanded that the Bush Administration make good on its assurances that it supports the principles of the UNFCCC by signing up to the Kyoto Protocol. Following Russia's ratification of the Kyoto Protocol, this international pressure has only grown. As one participant pointed out, though, only Americans will be able to persuade the Bush Administration to enact, for instance, mandatory targets as required under the Kyoto Protocol.

The hope was therefore expressed that action taken on a state level to, for instance, implement a "cap-and-trade" system for GHG emissions, as in the case of several Northeastern states, would provide a model for action on a federal level. Initiatives by Republican politicians such as Governors Pataki and Schwarzenegger were highlighted in particular, since participants felt that they demonstrated that the Bush Administration's approach is not uncontested, even within his own party. Several participants rejected the possibility that local or state action could force federal action, pointing out that industry had launched legal challenges to defeat measures such as stricter emissions standards in California and would most likely succeed in having these measures struck down.

Nevertheless, even on a federal level, alternatives to the Bush Administration's approach have been advanced. Though the McCain-Liebermann Climate Stewardship Act has not been able to pass the Senate, the persistence of its supporters in the Democratic and Republic parties was seen as a positive sign. The fact that several other climate policy bills have also been submitted in the Senate and House appears to demonstrate that the issue of climate change is being taken seriously by members of Congress and their constituents.

The 2005 G-8 Summit

The host country of the next G-8 Summit, the United Kingdom, has selected climate change, an issue that Prime Minister Blair has called

"the world's greatest environmental challenge," as one of two topics at the top of the agenda for this event. In particular, the Blair government will endeavor to find means to build a solid foundation for climate policy based on science, to reach an agreement on cooperative research and development, and to engage countries outside of the G-8 at the meeting. This approach harmonizes with the current US climate policy, which emphasizes further scientific study of climate change and the development of technological solutions to address the problem, as well as US demands for greater involvement of developing countries in the reduction of GHG emissions. The accommodation of US interests may be of particular importance, since consensus will be key to the success of the G-8 Summit.

COP-11

Due to the ratification of the Kyoto Protocol by the Russian Federation, COP-11 will also serve as the first Meeting of the Parties to the Kyoto Protocol (MOP-1) and will give legal status to the rules of the Protocol. In spite of its flaws, many participants felt that, simply by taking effect, the Kyoto Protocol has already had a positive influence on climate policy, sparking investment into renewable energy sources. Its entry-into-force has also broken the stalemate that had for years paralyzed international climate policy, giving experts and policymakers the opportunity to turn to shaping a post-Kyoto future. Differing perceptions of climate change may, however, impede efforts to negotiate an international agreement for the post-2012 period: While industrialized countries consider climate change to be an environmental issue, developing countries see it primarily as a question of equity and indeed of survival.

The declared opposition of the United States towards any agreement exempting major developing countries from the responsibility to limit their emissions was cited as a major argument for the necessity for an inclusive, even universal process. At the same time, the United States has been focusing heavily on bilateral negotiations in developing its international climate policies. Thus, two possible approaches emerge: To negotiate a less stringent agreement acceptable to a major-

ity of countries and later expand its scope and depth or, to build a coalition of like-minded states to be bound by strict principles and gradually expand this coalition.

Though some argued that any negotiations outside of the United Nations framework would simply dilute the UNFCCC process, it was suggested that a combination of bilateral and multilateral approaches and top-down and bottom-up approaches may be necessary to achieve a comprehensive solution to the issue of climate change. One participant pointed out, for instance, that Italy is a party to the Kyoto Protocol but has also signed bilateral agreements with several developing countries to advance climate protection.

Since the Kyoto Protocol has already proven its symbolic value, while its mechanisms have yet to demonstrate their effectiveness, the suggestion was made that agreements negotiated within the framework of the UNFCCC should avoid penalties and even specific language and instead focus on long-term objectives. While a number of participants agreed that a rigid architecture may need to be avoided to ensure maximum participation, most considered targets and institutionalized mechanisms for reporting, cooperative research and development, and other tasks to be indispensable. Air and sea transportation were mentioned as possible areas that could be covered in future agreements.

Bridging the gap to long-term solutions

The participants of the workshop generally agreed that a completely new generation of technologies must ultimately be developed in order to defeat climate change. At the same time, most participants felt that the threat posed by climate change is so imminent that waiting for these breakthrough technologies to be developed is not a feasible approach.

Several options for utilizing currently available technology were suggested including mainly low- or no-regrets options such as the improvement of fuel economy, modification of house construction, and on-site sequestration of carbon dioxide resulting from (liquid) natural gas production. Offering significant benefits at relatively low cost, these technologies are the most likely to obtain the necessary political

backing necessary to implement them. However, even sequestration, currently touted as a panacea to all carbon emission problems, may not be a permanent solution from an environmental standpoint, since leakages rates will most likely never be negligible.

Policies promoting the application of renewable energy technologies have already had demonstrated success in improving the sustainability of energy consumption in countries such as Brazil, whose pioneering biofuels program has acted as a model for other developing countries. In order to achieve such a success, the target market must be taken into account when selecting an appropriate technology to pursue: Thus, while biofuels may be a sensible option for certain developing countries, expensive photovoltaic cells may not.

Already a topic of vigorous discussion at the First Transatlantic Dialogue on Climate Change [2], the controversy over "technology push" as opposed to "market pull" resurfaced at the Fourth Transatlantic Dialogue. Advocates of the "market pull" approach suggested that governments had the political imperative to "change the framework of profitability" for the private sector through economic incentives. They argued that ultimately billions, if not trillions of dollars of investment would have to be mobilized to bring about a technology revolution, investment on a scale only available if the private sector were encouraged to act. One industry representative posited that industry would ultimately prefer a stricter, but unified system of regulations to a fragmented system. This same representative cautioned, though, that policymakers in the United States, especially on a federal level, have traditionally been wary of imposing the type of regulations required by the "market pull" approach.

Two major concerns were expressed with regard to the "market pull" approach. Firstly, investors, traditionally risk-averse, may not invest in new technologies if long-term consistency of government policy could not be assured, dooming many "market pull" policies to failure. Secondly, consumers, likely to be affected by these policies, are also voters and might resist efforts to introduce regulation and taxation.

2. Ochs, A. and A. Venturelli, Towards a Transatlantic Consensus on Climate Change: High-Level Transatlantic Dialogue on Climate Change, Villa Vigoni, 16th-18th October 2003, Villa Vigoni, VIII, 2 / May 2004.

Though the resources available through public sector technology initiatives may be more limited than those potentially available in the private sector, the effect of "technology push" policies should not be underestimated. Such programs may, for instance, provide the spark necessary to trigger market introduction of new technologies. As one participant noted, though, the primary driver of research and development in the United States is defense, which tends to direct funding towards small-picture projects. Additionally, certain areas of research such as nuclear fission and advanced fossil fuel technologies currently garner a lion's share of funding, starving other areas such as renewable energy technologies of funding.

Improving energy security

While temporary spikes in the price of oil and other fossil fuels may, in some cases, provide the impetus for the enactment of more stringent measures to reduce their consumption, one participant warned against relying on elevated energy prices to force government action. Due to the high short-term volatility of fossil fuel prices, the political momentum driving campaigns for measures such as greater fuel efficiency may evaporate before legislation can be passed.

The observation that, on average, fossil fuel prices have remained persistently low led to the recommendation that these prices should be adjusted to reflect the environmental costs associated with the use of fossil fuels. Some participants suggested that simply liberalizing domestic and international energy markets would effect an internalization of these environmental costs. To this end, the United States and Europe should reduce fossil fuel subsidies and use their considerable influence over oil-rich states such as Russia and former Soviet republics to combat market-distorting policies, though the lack of unity within the European Union contrasted with the strong centralization in Russia might make a tough negotiating position on the European side difficult to maintain. Other participants felt that "political engineering" in the form of a carbon tax or emissions trading scheme will also be necessary in order to bring about the necessary adjustment in energy prices.

Whether as a result of liberalization or "political engineering," a resulting increase in fossil fuel prices would likely decrease demand for such products while raising demand for alternative energy sources. Beyond the advantages to be gained for the environment, a reduction in fossil fuel use might also benefit national security. Europe and the United States are currently locked in a state of dependency on oil and gas from a region stretching from Northern Africa through the Middle East to the Caspian Sea. In spite of efforts to diversify the geographic origins of fossil fuel supply, according the International Energy Agency (IEA), Europe and the United States are expected to become ever more dependent on these politically unstable regions of the world, particularly the Middle East.

As major energy consumers such as China and India begin to compete for a larger share of the fossil fuel market, Europe and United States will become ever more vulnerable to price shocks, which could inflict severe damage on their economies. Since neither India and China are members of the IEA and therefore not obligated to submit energy consumption statistics or maintain oil reserves, they are unpredictable players in the energy market and prone to panic buying, which would exacerbate trends towards higher oil prices caused, for instance, by terrorism in the Middle East.

Thus, greater diversification not merely of fossil fuel sources but rather of the mix of energy sources, through the greater incorporation of fossil fuel alternatives, will be needed to improve the resistance of Europe and the United States to external influences and thus increase their level of national security.

Laying the groundwork for post-2012 climate policy

The presence of solid political groundwork both within the governments in question and the wider public was generally recognized to be requisite for the success of future climate policy. As a case in point, many participants pointed to the Kyoto Protocol, which had been doomed to failure in the United States as a result of the absence of such a foundation. Ultimately, the Clinton Administration had then

proven unwilling to invest the political capital needed to overcome this obstacle and ensure the ratification of the Kyoto Protocol.

Making existing mechanisms and institutions, chiefly those created under the Kyoto Protocol, work may be indispensable to further progress in international climate policy. Achieving this goal will likely be a serious challenge, since such mechanisms as the Clean Development Mechanism (CDM) were judged by at least one participant to be "a disaster" and the Kyoto emissions trading market a source of "interesting trading opportunities" but "with little environmental effect." Nevertheless, the functioning of these instruments would provide the architects of post-2012 climate policy with the political momentum essential to advance their agenda as well as a source of institutional capacity and invaluable experience. On the other hand, a failure might block progress, at least within the United Nations framework, for years to come. Thus, members of the Kyoto Protocol will have to demonstrate earnest commitment to its instruments, both politically and financially.

In order to rebuild the damaged reputation of climate policy in the United States and pave the way for future international agreements, what will also be necessary is what one participant termed "reframing the debate." In other words, a transformation in people's perceptions of climate policy must be fostered. To achieve this goal, the political argument for policy action should be built around the value of a stable climate. Furthermore, an awareness of the true cost of goods and services in terms of environmental, economic, and social impacts might be raised, for instance, by monitoring the carbon intensity of public expenditure.

Influencing the media, a key player in shaping public perceptions of climate policy, will not be an easy task. As an example, the US media's widespread practice of giving equal attention to the minority of experts skeptical of the existence of anthropogenic climate change as to the majority of experts convinced of its existence also hampers efforts to rally public support for more active climate policy. Recently passed information quality regulations and standards may diminish the availability of data supporting the hypothesis of anthropogenic climate change, since such often controversial data could be blocked from dissemination based on these legal instruments.

U.S. CLIMATE POLICY AFTER THE PRESIDENTIAL ELECTION: CONTINUITY OR CHANGE?

Ambassador Richard Elliot Benedick[1]

Introduction

It may be somewhat risky, so soon after the reelection of President George W. Bush, to accept the challenge to forecast whether America's climate policy for the coming four years will change or remain constant. However, based on recent developments, I believe that U.S. climate policy in the foreseeable future will be characterized by both continuity and change. There is likely to be relative continuity at the level of the federal government, but change – lots of it – almost everywhere else: in states and local communities, in the Congress (especially the Senate), in the private economy, and in the scientific and nongovernmental communities.

The signs of a change in course toward much greater recognition by Americans of the risks of climate change, and toward more pro-active climate and energy policies, are more than wishful thinking by environmental activists – rather, it looks like the beginnings of a groundswell.

The United States and the Kyoto Protocol

Nevertheless, I do not mean to imply that the United States will ratify the Kyoto Protocol, at least in its current form. Recall that in 1997, several weeks before the all-night negotiations in Japan, the U.S. Senate rejected the prospective treaty by a 95-0 vote in a rare demonstration of bipartisan unanimity. Bearing in mind that a two-thirds majority is required for United States ratification of any international agree-

1. Senior Advisor, Battelle Pacific Northwest National Laboratory, Joint Global Change Research Institute; President, National Council for Science and the Environment; Visiting Fellow, Wissenschaftszentrum Berlin. Formerly Deputy Assistant Secretary of State and chief U.S. negotiator of the Montreal Protocol on Substances That Deplete the Ozone Layer.

ment, it would be unrealistic to count on the U.S. joining the Kyoto Protocol as it is presently constructed. The manifold reasons why the U.S. cannot accept this peculiarly flawed and inequitable treaty have been described by me three years ago in a book published by the Max Planck Institute for Biogeochemistry[2] and in subsequent 2001 and 2003 articles for the U.S. National Academy of Sciences[3] and, more recently, by Professor Scott Barrett in his brilliant new book, *Environment and Statecraft*[4].

Quite apart from the virtues or vices of the Kyoto Protocol, I would not contend that the U.S. Government for the past 15 years has demonstrated an exemplary commitment toward addressing the risks of climate change, nor that it is pursuing optimal energy policies aimed at limiting emissions of carbon dioxide. Many scientists and other observers in the United States believe that the government's attitude and policies on the climate issue are, quite bluntly, inadequate.

Having conceded this point, however, it may nevertheless be time for European politicians and nongovernmental activists – who are not immune to a bit of hypocrisy – to stop wielding the Kyoto Protocol as a club with which to hammer the United States because they are irked at America for various other reasons that have nothing to do with the threat of climate change. The awkward fact is that many of these same European countries will not be in compliance with their 2008-2012 Kyoto targets unless they engage in emissions trading to purchase the notorious Russian "hot air" – i.e., emissions "rights" accruing to Russia simply because its collapsed economy in 1997 already had 30 percent lower emissions than the Kyoto negotiators had disingenuously allowed it as a future "target." In other words, the European purchasers of Russian "hot air" will get credit for emissions that had already declined long before the treaty was signed!

2. Benedick, R.E., "Contrasting Approaches: The Ozone Layer, Climate Change, and Resolving the Kyoto Dilemma," in E-D Schulze, et al., eds., Global Biogeochemical Cycles in the Climate System. Max Planck Institute for Biogeochemistry, Academic Press (Harcourt Brace): San Diego, London, Tokyo, etc. 2001.
3. Benedick, "Striking a New Deal on Climate Change," National Academy of Sciences: Issues in Science and Technology, Fall 2001. Also, "Climate Research," Ibid., Spring 2003.
4. Barrett, S., Environment and Statecraft: The Strategy of Environmental Treaty-Making, Oxford: Oxford University Press, 2003, chapter 15.

Ironically, the European Union had vigorously objected in 1997 to the emissions trading provision proposed in Kyoto by the United States. The Kyoto negotiation's outcome in fact presented the EU with a significant serendipitous advantage over the United States, since by 1997 their emissions were, like Russia's, already significantly below the 1990 base year against which future emissions would be measured. This anomaly was a consequence of West Germany's reunification with the collapsing DDR in 1990 (which gave the reunited Germany an artificially high emissions base level), and the British government's political action to reduce the power of coal miners' unions by subsidizing a switch to natural gas. The Europeans were, as a result, confident that they, unlike the United States, could reach their Kyoto targets without needing to buy emissions rights from others. As it happened, they turned out to be wrong. The Kyoto Protocol is replete with other ironies, inequities, complexities and flaws, not least concerning the accounting for "sinks" (land use and forests) that can be applied to offset gross emissions.

Instead of continually harping on the U.S. rejection of Kyoto, it might be illuminating for foreign observers to lift their gaze beyond the White House and see what's actually happening all across America.

Continuity

But before examining the evidence for "change," let us begin with the negative side of the ledger: the probable "continuity" in climate policy at the U.S. federal level. Many observers see a disturbing tendency in recent years for the U.S. government to rely on scientific uncertainty as a rationale for avoiding hard decisions on energy policy. They note that the government calls for ever more scientific research on climate change but then downplays or ignores the results of such research. In contrast, it may be recalled that President Ronald Reagan in 1987 overruled his own ideologically-inclined Science Advisor and Cabinet Secretaries and instead personally approved the strong U.S. position on chlorofluorocarbon (CFC)

controls that had been endorsed by the State Department and the scientific community and that led (over European opposition, incidentally) to the historic Montreal Protocol on protecting the stratospheric ozone layer[5].

The U.S. Administration has cast doubt on the international scientific consensus on climate change as reflected in periodic reports of the Intergovernmental Panel on Climate Change (IPCC)[6]. When President George W. Bush commissioned the U.S. National Academy of Science in 2001 to reexamine IPCC conclusions with particular attention to remaining uncertainties, a special Academy panel of eminent scientists substantially confirmed the IPCC warnings[7]. The government's response was the highly publicized launching in 2002 of the U.S. Climate Change Science Program[8], which has not, however, led to significant policy change.

In summer 2004, the resulting federal interagency interim report, signed by both the Secretaries of Commerce and of Energy, concluded that climate change is not due solely to natural causes, i.e., that fossil fuel emissions have increased the risks[9]. The President's Science Advisor, however, maintained that this finding did not have implications for U.S. policy. A few months later, the comprehensive Arctic Climate Impact Assessment project[10], involving 300 independent scientists from the U.S. and seven other nations, warned of increasing evidence of warming; the White House response was a statement from the Council on Environmental Quality that the President would strongly oppose any policy that would contribute to the loss of a single American job.

5. Benedick, Ozone Diplomacy, Cambridge: Harvard University Press, rev. ed. 1998, chapter 5.
6. Intergovernmental Panel on Climate Change <www.ipcc.ch>
7. U.S. National Academy of Sciences, National Research Council, Climate Change Science: An Analysis of Some Key Questions. Washington, 2001.
8. U.S. Climate Change Science Program <www.climatescience.gov>
9. United States Global Change Research Program, Our Changing Planet: The U.S. Climate Change Science Program for Fiscal Years 2004 and 2005, Washington, August 25, 2004.
10. Arctic Council and the International Arctic Science Committee, Impacts of a Warming Arctic, Arctic Climate Impact Assessment, Cambridge University Press, 2004.

Change

Administration

It seems reasonably clear that the President and his closest political advisors continue for the time being to opt against compulsory limitations on carbon dioxide emissions. Instead, the Administration speaks of voluntary measures, and it promotes federal technological research, mainly directed at carbon capture and sequestration, clean coal technologies, and energy efficiency. But neither in the United States nor in Europe do current energy research and development programs begin to approach the scope and magnitude required for the technological revolution that will be necessary if the world is to effectively address climate change over the coming decades.

Congress

Turning to signs of change elsewhere in the United States, the Senate appears increasingly concerned that America should not remain globally isolated on the climate change issue, in the lonely company of a few OPEC countries. As early as 2001, notwithstanding the Senate's unambiguous rejection of the specific Kyoto approach, prominent senators of both parties called for constructive U.S. re-engagement with the international community in devising appropriate policies to reduce fossil fuel emissions.

Last summer, a bipartisan bill, co-sponsored by Republican John McCain and Democrat Joseph Lieberman, provided for a mandatory domestic "cap-and-trade" policy for carbon dioxide – similar to the successful U.S. approach some years ago that virtually eliminated power plant emissions of sulfur dioxide that caused acid rain. The McCain-Lieberman bill unexpectedly attracted 43 affirmative votes. While not enough to pass, this is nevertheless a clear signal that a growing number of Senators are becoming uneasy with existing federal policy. In November, Senator McCain immediately called a hearing following the White House dismissal of the Arctic report. Senator Chuck Hagel, a senior Republican and early critic of Kyoto, recently

announced his intention to meet with British Prime Minister Tony Blair in 2005 to discuss international cooperation on the climate issue. Plans are currently under way for reconsideration of energy bills in the next Senate term.

State and local governments

Leaving Washington, climate policy in the states and local communities is also evolving rapidly. Within America's truly federal system, individual states can play a significant role as forerunners of national policy. More than thirty years ago, California led the world in requiring automobiles registered within its boundaries to be equipped with catalytic converters. It was followed by New York and a few others, and the changed market conditions forced U.S. automobile manufacturers to accept nationwide standards for unleaded gasoline – far earlier than Europe, by the way. A few years later, the same thing happened with spray cans propelled by the ozone-depleting chlorofluorocarbons. Again, bans in a handful of states soon led to national legislation. The fact is that industry abhors a patchwork of regulations and differing standards for different parts of the country. For the manufacturer, such a situation is costly and inefficient, and hence, he becomes more amenable to nationwide rules.

Just within the past two years we are witnessing a growing interest in addressing the climate issue through concrete measures at state and local levels – and this includes both "red" states (those that voted Republican in the recent presidential election) and "blue" states (Democrat). At the forefront are the two most populous states, California and New York, both with prominent and popular Republican Governors (Schwarzenegger in California, Pataki in New York). Actions in these states, as well as in such states as Illinois, Michigan, Ohio, Pennsylvania and Texas, can have a powerful impact – these are big economies, with energy use exceeding that of many European nations. A coalition of New England states and Canadian Eastern provinces is currently planning a regional emissions trading system with the long-term goal of reducing carbon dioxide emissions by 70-80 percent. In the absence

of federal action, Maine is initiating its own emissions trading among power plants within the state. Eighteen states have established measures to promote renewable energy sources. On the Pacific coast, the Governors of California, Oregon and Washington are collaborating on stricter motor vehicle efficiency standards and renewable energy incentives. Growing citizen concern in Alaska over unusual heat, coastal erosion, and changes in vegetation and wildlife has prompted the state's two Republican Senators to call for reconsideration of measures to limit carbon dioxide emissions.

At the local community level, the mayors of over 150 American cities, representing 46 million people, have joined in petitioning Washington to enact federal energy legislation to address the risks of climate change. "Clean buses," running on natural gas and bearing large signs advertising this fact, began to appear four or five years ago in a few scattered municipalities. Now the trend has spread rapidly throughout the country, north, south, east and west – even Salt Lake City in solidly Republican Utah. Washington DC also recently introduced these vehicles, unmistakable for their shape and large inscription, "This Bus Runs on Clean Natural Gas," that can easily be seen from the windows of the White House and the Congress.

Industry

Compared to the situation as recently as five years ago, there are many signs that U.S. industry is also beginning to consider the threat of climate change in a new light. More and more business leaders are calling for effective government actions to control fossil fuel emissions, promote energy efficiency, reduce dependence on Middle East oil, and encourage expanded use of renewable energy. At least 40 companies – including such giants as Alcoa, Chevron, Dow, DuPont, Ford, IBM, General Motors, 3M, and Xerox – have voluntarily introduced internal measures and targets to lower emissions and conserve energy.

Spurred by growing concern over climate change liability from insurance companies and institutional investors, there is evidence of increasing industry support for a compulsory cap-and-trade system as

proposed in the McCain-Lieberman bill. The existing atmosphere of regulatory uncertainty in the United States, combined with measures being enacted abroad, is clearly making American industrialists nervous.

Civil society

Finally, American scientists, nongovernmental organizations, and even religious groups are joining in a rising chorus of appeals for more future-oriented energy policies. Some environmental organizations that exaggerated the "global warming" threat 15 years ago, thereby damaging their credibility and inducing a certain public apathy, are now making the case for action more responsibly and therefore more persuasively, while no less forcibly. Civil society in America is alive and well and an important force for change.

A new approach to negotiations

Assuming that American attitudes and policies do change, what will this mean for the Kyoto Protocol? Even after the Protocol formally enters into force in early 2005, it is highly questionable whether it will lead to meaningful global emission reductions. Realism suggests that those committed to effectively addressing climate change should not limit themselves to working solely within the existing treaty architecture. Political leaders on both sides of the Atlantic should now eschew the rhetoric and recrimination surrounding Kyoto and instead begin to think creatively about new and innovative modes of international cooperation.

More effective measures could probably evolve from negotiations among groups of like-minded nations, both North and South, smaller in scale and more focused in agenda than the current, inefficient 186-nation mega-conferences. There is, after all, no immutable international law that requires every United Nations member to be involved in negotiating every aspect of the climate problem at the same time.

One could begin by focusing on those nations that contribute most

to global emissions. Indeed, in addition to the industrialized countries enumerated in the Kyoto Protocol's Annex B, emissions-limiting measures in 10 to 15 major "newly industrializing countries" of the South (who have heretofore resisted any commitments) will be absolutely essential if global emissions are to decline during this century. China's emissions are already larger than those of every industrialized country except for the United States, and they continue to rise steeply; India's emissions exceed those of Germany; South Korea ranks higher than France. Mexico, South Africa, Indonesia, Iran, North Korea, Saudi Arabia and Brazil are among other newly industrializing nations with rapidly rising emissions that already exceed those of most "richer" Annex B countries. There have been signs that some of these countries might be willing to consider assuming commitments, but they are hindered by traditions of solidarity within the developing nations' traditional UN negotiating bloc, the "Group of 77." Why not attempt to engage such governments in more flexible and specifically focused forums outside of the Kyoto structure?

A new approach to policy

Absent a new generation of varied energy technologies, neither North nor South will be able to achieve the needed emissions reductions. Yet many major countries (notably in Europe) have actually reduced their budgets for energy research and development. Therefore, a high priority on the international agenda should be a "research protocol" involving both industrialized and developing nations that possess substantial scientific capacities. Such an agreement would provide a focus for increasing budgets and serve as a much-needed stimulus for the indispensable technological innovation. The development of new emissions-reducing and emissions-avoiding technologies must also be coupled with effective commitments and modalities to transfer these technologies to the newly industrializing countries. As was demonstrated by the experience of the 1987 Montreal ozone protocol, developing countries will only accept commitments when they are assured of access to the modern technologies.

As a supplement to the Kyoto Protocol's attempt at a global solution, consideration should be given to disaggregating the issues by negotiating "parallel regimes" on different subjects by small groups of countries according to their interests and capabilities. Cooperative energy technology research is but one example. Other possible sectoral and structural approaches should also be examined. Why not a protocol on vehicle emissions reductions negotiated among the relatively few automobile-producing nations, North and South? Such an accord could both mandate cooperative research among the auto companies, and also ensure access by the South to resulting new technologies. Or an agreement among countries interested in designing and implementing government procurement programs based on low emissions, energy efficiency, and renewable energies? Similar programs in other areas have had a profound effect on technological innovation and market behavior, e.g., when the U.S. Defense Department changed its procurement standards in 1991 to effectively disqualify the ozone-depleting chemical CFC-113. Various combinations of public-private partnerships for technology development and diffusion should also be actively pursued.

Conclusions

In sum, it appears to me that the current American scene with respect to climate and energy policy is in a stage of ferment. Life, as politics, can always surprise. A Presidential second term can differ significantly from his first. President Bush's eye is now on history, and he can afford to ignore extremist supporters who got him elected. One may recall that President Reagan's second term had quite a different tone from his first term. The rhetoric of "Evil Empire" evolved into rapprochement with Russia and close collaboration on disarmament.

Now, the 2006 mid-term congressional elections, when the entire U.S. House of Representatives and one third of the Senate face re-election, are drawing ever closer under a growing shadow of concern about climate change. Who knows how the combination of changes in Congress, possible new foreign alliances, and growing pressures

from American industry, civil society, and states and cities, may affect the U.S. government's climate policies in the next few years?

To conclude, I would like to leave with you the wisdom of that incomparable British leader, Winston Churchill – who had his own share of problems with the United States during the period before, during, and after World War II. "Don't worry about the Americans," cheerfully advised Sir Winston, "they almost always do the right thing – usually after trying everything else first!"

Note

This article is based on the author's keynote speech at the Fourth Transatlantic Dialogue on Climate Change, sponsored by the Stiftung Wissenschaft und Politik and the Italian Ministry for the Environment, November 19-21, 2004, at Villa Vigoni, Loveno di Menaggio, Italy.

CLIMATE CHANGE: THE NEED FOR EFFECTIVE RESPONSES AND OPTIONS

Fabrizio d'Adda[1]

1. Russia ratification: the kick-start of the Kyoto Protocol

The long incubation of the Kyoto Protocol (KP) ended at last, with the Russian ratification confirmed and the consequent entry-into-force of the Protocol early 2005. At that time, the provisions and the mechanisms established by KP and secondary legislation by the various Conferences of the Parties (COPs) will have legal force, in particular the Annex I Parties' commitments to greenhouse gas (GHG) limitation.

2. How distant are the Kyoto targets?

Taking into account that 2008 is the beginning of the first commitment period (2008-2012), it is clear that the long delay accumulated so far can hardly be annulled. This could occur only through a program aimed to rapidly implement the entire array of the possible GHG reduction measures.

Most of the Annex I Parties have maintained their business-as-usual growth of GHG emissions (Table 1). At present the overall gap with respect to the Annex I KP target is large, and it appears to be incompatible with a realistic compliance path (Figure 1), if only domestic GHG reductions are utilized.

In the year 2000, the Annex I countries had a cumulative GHG emissions of 17,473 $MtCO_2e$ (million metric tons of carbon dioxide equivalent), with an expected increase to 19,063 $MtCO_2e$ at 2010, versus a Kyoto target at the same year 2010 – the middle of the first commitment period – of 17,028 $MtCO_2e$. If we consider a BAU scenario with a realistic economic growth and we assume that the internal mea-

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sures already identified are fully implemented, by the year 2010 we expect the following gaps (Table 2):

- Annex I +2035 $MtCO_2e$/year (gap)
- US +2499 $MtCO_2e$/year
- EU-15 +253 $MtCO_2e$/year
- EU-25 –3 $MtCO_2e$/year (surplus)

We must also emphasize that Annex I Parties represent a mixed lot:

- the Annex I gap of +2035 $MtCO_2e$ results out of an overall deficit of 3263 $MtCO_2e$ and a surplus of – 1228 $MtCO_2e$ (EIT countries: Russia –597; Ukraine -201; Poland –137 $MtCO_2e$);
- some countries, in particular those with economies in transition (EIT), are far below their Kyoto targets, not out of virtue but due to severe economic reshufflings. Consequently their expected surplus of Assigned Amount Units (AAU) is considered "hot air." When these countries resume their economic growth, the hot air could rapidly evaporate. Furthermore, EIT countries may bank their AAUs surplus in view of future increase of their GHG emissions;
- the United States, which decided not to ratify the KP, are well above their target (6979 $MtCO_2e$ in the year 2000 vs. a target of 5616 $MtCO_2e$ at 2010);
- EU-15, which is committed to comply with KP, has a gap of about 252 $MtCO_2e$ with a majority of countries in a deficit position (323 $MtCO_2e$, of which Italy 100 $MtCO_2e$ and Netherlands 59 $MtCO_2e$);
- the position of EU-15 improves if we add the 10 accession countries, which at present are far below their caps (Poland alone has a surplus of - 136 $MtCO_2e$).

Considering that compensating the gap and surplus positions would be difficult for non-compliant countries and time is limited, it is necessary that gap positions be offset with real GHG reduction measures, be they internal or external.

In order to comply with KP commitment, these gaps should be offset starting from 2008, the beginning of the first commitment period. Needless to say, the time remaining for full compliance is extremely short.

3. The need for action

The present gap is cause for further concern if we consider that the ultimate KP goal is to stabilize GHG concentrations in the atmosphere, particularly CO_2, at levels that are not dangerous for the earth climate. IPCC in its 2000 Special Report on Emission Scenarios (SRES) developed a set of possible scenarios, covering a wide range of the main driving forces of future emissions, from demographic to technological and economic developments. This simulation activity also allowed the drawing of stabilization profiles at three different levels of CO_2 concentration: 450, 550, and 650 ppm (the present value is about 370 ppm).

The stabilization of CO_2 concentration will require emissions reductions globally. As we would expect, the peak of global emissions becomes lower and closer, in terms of time, as the stabilization level decreases.

The dates for global emissions to peak indicated in Table 3 are associated with CO_2 stabilization alone. If the other non-CO_2 GHG are taken into account, the stabilization of CO_2 equivalent concentrations needs to occur earlier. The anticipation required by considering the other non-CO_2 GHG can be substantial, if we consider that the increase of the CO_2 equivalent concentration since the beginning of the industrial era has been about 170 ppm, of which 90 due to CO_2 ant the remaining part to the other GHG (Figure 2).

The issue of the CO_2 equivalent stabilization is, from the scientific point of view, a very complex one. The IPCC is now in the process of defining the concentration at which CO_2 should be stabilized, but a decision has not yet been taken.

Many uncertainties remain, but in any case there is a growing consensus in the scientific community that, also in view of the precaution-

ary principle, the time to act is now. Assuming a stabilization of CO_2 at 550 ppm, almost twice the pre-industrial concentration, large and increasing reductions will be required with respect to BAU scenario, both in the Annex I and in non-Annex I world (Figure 3).

4. The approach to GHG reduction

If we consider the extent of the expected gap to be about 2 $GtCO_2e$/year, there is a need for reduction mechanisms which can be easily, rapidly, and effectively deployed on a large scale, both as internal measures in the Annex I Parties and as flexible mechanisms in non-Annex I Parties (Clean Development Mechanism) and in Annex I Parties below their targets (Joint Implementation).

Due to the reasons explained above, compensation between "long" and "short" Annex I Parties may have a minor role and therefore it is necessary to identify and implement real GHG reduction projects. Considering that the first commitment period starts at the year 2008, any delay or barrier to implementing projects with real, measurable and long-term reduction potential would be unjustified.

Where the GHG reductions occur is not important, at least in this first phase of catching up with the KP targets, provided that their size and their implementation are consistent with the CO_2 stabilization path. Many countries, both developed and developing countries, have energy systems whose overall efficiency is far below the best available technology (BAT) level. Reducing or removing these inefficiencies is a priority target, because it can lead to significant GHG reductions just by using available technologies.

Many countries, even those who have committed to GHG reductions, while starting the implementation phase, have had second thoughts on their engagement, since GHG reductions can negatively interfere with economic growth. Building confidence in our ability to cope with the KP targets, without impairing economic growth, is a prerequisite for avoiding negative reactions, resistance, and possible setbacks. In this starting phase of the KP and in view of the Kyoto Plus (post-2012) discussions, it would be desirable to achieve the required

GHG reductions while turning this endeavour into economic growth opportunities. This is the real challenge in the first phase of the Kyoto implementation in view of the final CO_2 stabilization.

5. The portfolio of GHG reduction measures

GHG reductions need to be implemented at a time when the oil price and, in parallel, the price of the other fossil fuels are skyrocketing. Although this upsurge is due, at least partially, to temporary drivers, we cannot exclude that, after the contingent drivers disappear, a permanent increase of the oil price will remain.

GHG reductions measures are generally expensive, and they could be spurred by internalizing their associated environmental externalities. Figure 4 shows the size of the possible externalities for different fossil fuels (they differ in terms of CO_2 emission factor) as a function of the unit cost assigned to 1 ton of CO_2. We can see that the externality could reach significant values at the CO_2 costs corresponding to the sanctions for non compliance foreseen by the ET directive (40 and 100 €/tCO_2, respectively, in the first and in the second period). However, in the present economic scenario of the oil and related energy prices this added cost might not be tolerated, due to negative impacts on the economic growth. As a consequence, a strong preference should be given to no-regret or very low-cost GHG reduction measures.

This is an important criterion to select the actions to be included in the GHG mitigation portfolio. This criterion is severe, since it calls for a rational management of the mechanisms available for GHG reduction and for a careful identification of the industrial sectors that are more conducive to no-regret or low-cost GHG projects.

5.1 Energy efficiency

In the realm of the fossil energy sources, GHG reductions depend upon the choice of the fuel and of the conversion/utilization technology used. It is well known that fossil fuels are not equal in terms of

CO_2 emission factor, which depends on the chemical composition of the fuel: the greater the carbon content per energy unit is, the higher the CO_2 remission factor.

In this respect natural gas is and will remain the fuel of choice, with an emission factor (56.1 $kgCO_2/GJ$) lower than oil (77.4 $kgCO_2/GJ$) and much lower than coal (94.6 $kgCO_2/GJ$). Furthermore, the chemical and physical properties of natural gas allows the utilization of high efficiency technologies, particularly in power generation where advanced Natural Gas Combined Cycles (NGCC) have already reached a 58% overall electrical efficiency; therefore in power generation (PG) the intrinsic environmental advantage of natural gas is further enhanced (Figure 5).

NGCC may have a very important role to achieve massive GHG reductions, both in and outside Annex I countries. Indeed, PG accounts for about 1/3 of global GHG emissions and its share is increasing. PG units, on the other hand, have a very long technical life and they remain in operation even when the best available efficiency improves. Therefore it is not surprising that the average efficiency of the thermoelectric park is far below the BAT efficiency. Figures 6 and 7 show the average emission factors of power produced, respectively, from natural gas and coal. Considering that the best emission factor from NGCC is about 360 gCO_2/kWh, a wider deployment of NGCC could generate significant GHG reductions both in Annex I and in non-Annex I countries.

Of particular interest for Europe is the potential of GHG reductions in NG-based PG in Russia, where the CO_2 emission factor is very low due to aged and badly maintained units. By replacing these highly inefficient PG plants with modern low-emitting units, it would be possible through Joint Implementation projects not only to achieve real, measurable, and long-term CO_2 reductions but also to save large volumes of NG, which could be exploited for further CO_2 reductions.

From Figure 6 it is clear that CO_2 reductions can also be gained in EU-25. To this end the forthcoming Emission Trading Scheme should be implemented in a way that is able to promote the adoption of BAT,

at least in the new entrant units. This means that the National Allocation Plans should use allocation methodologies that refer to the best BAT (this appears not to be the case in some National Allocation Plans [NAPs]).

Figure 7 shows that also coal-based power stations are far from the relevant BAT efficiency (emission factor of the order of 800 gCO_2/kWh), which means that CO_2 reductions could be gained from the early adoption of the best conversion technologies. Even higher reductions would ensue from fuel switching from coal to natural gas. In this case, the operating costs would increase, which will have an impact also on natural gas (and on coal), especially in the present upsurge of the oil price, but capital expenditure (CapEx) would decrease and overall efficiency would be largely improved. The supply security of natural gas should not cause much concern, since natural gas is a relatively under-developed energy source and its supply is based on the construction of big transportation infrastructures and, hence, on long-term contracts. The NG import infrastructures create mutually beneficial interdependences, which so far have not experienced any supply interruptions.

The overall GHG reductions that can be gained from increasing PG efficiency and fuel switching can be estimated only through a detailed analysis of the thermoelectric park in the areas of interest (EU-25, Russia, China,...). However the potential appears very large and a reduction of 300 $MtCO_2$/year is considered feasible.

5.2 Demand side energy management

Eco-efficiency is also key to achieving GHG reductions from the energy end-uses. While the emissions trading (ET) addresses the GHG emissions by major industrial installations, specific instruments to promote energy efficiency in transportation and civil sectors (space heating and air conditioning, electrical appliances, etc.) are not yet in place. An action in this direction would be beneficial not only to GHG mitigation but it will also spur a new wave of energy-saving initiatives, which are particularly required in the present oil price upsurge. In the

present situation of high energy prices, pursuing best available efficiency in the energy end-uses is a must.

The expansion of cogeneration, micro-cogeneration and district heating, the preference for low-consumption and low-emission vehicles, and the energy saving in space heating are measures that deserve increased attention and promotion instruments. A preliminary guess of possible GHG reductions is about 200 $MtCO_2$/year.

5.3 Gas Flaring and Venting down

Global gas flaring and venting is an important contributor to worldwide GHG emissions, amounting to about 400 $MtCO_2$/year. Therefore a large potential exist for Sustainable Development (SD) and Clean Development Mechanism (CDM), with a relevant contribution to the expected demand of Certified Emission Reductions (CER). A quick implementation of this category of projects could give a great support to the success of the KP in its first commitment period. One sustainable application of flared natural gas is the power generation for local uses (one example is the Eni Kwale project in Nigeria, which is near to being completed).

Often the producing countries suffer from high electricity shortages and consequently the grid is subject to frequent and severe instabilities. In this context, power stations fuelled by presently flared natural gas clearly contribute to SD of the host country and at the same time generate real, measurable, and long-term GHG reductions. Therefore they perfectly match the requirements of Article 12 of the KP, which defines the additionality required to CDM projects.

5.4 Sustainable Renewables

Achieving the goal of GHG stabilization will require that renewable sources leave the state of limbo in which they are currently trapped, becoming stable suppliers of the energy system. To this end, it is necessary to concentrate on the development of those renewable sources that are able to give substantial energy contributions and to

self-sustain economically in a CO_2-constrained context, where the environmental externality of CO_2 is internalized for fossil fuels and becomes an economic benefit for renewables.

Up to now the development of renewables has mainly leveraged on public subsidies, on the assumption that such subsidies will be forever. The old approach is not more justified if renewables are expected to give much more than a marginal contribution and to become economically self-sustained (though with the addition of the CO_2 externality).

The new approach, on the other end, requires carefully selecting the renewables that the development and deployment effort has to be focussed on. Although in this respect an in depth study is in order, it appears that there are options consistent with the requirements of potential large energy supply and economic viability.

One candidate is the biomass production in developing countries, with the double purpose to fulfil local needs, in particular for food, and to produce at the same time raw materials for energy or industrial uses. One example can be oilseed plantations for the combined extraction of proteins for human uses and biofuels for energy exports (raw biooil to be used for power generation or for further processing). Another example might be annual plantation (e.g. kenaf) able to provide high quality cellulose paste and residue for energy uses.

Biomass is a very attractive renewable since it incorporates the storage of solar energy and permits the compensation of daily and even seasonal fluctuations. It is CO_2-neutral, although this must be better assessed trough a detailed life-cycle analysis. It is also conducive to joint productions aimed at food and energy. It is based on annual production cycles and therefore can be rapidly implemented. Finally, biomass resorts to appropriate and simple technologies.

If we consider developed countries, an attractive renewable could be mild-concentration photovoltaic directly connected to the grid. Mild concentration (< 10 suns) allows the reduction of the investment cost of peak-kW, while using both direct and diffuse sunlight; direct connection to the grid avoids electrical storage. All this may result into

a reduced cost of the electricity, which on the other end has high value because it is produced during peak-hours of the electrical grid.

The evaluation of the potential GHG reduction attached to sustainable renewables calls for detailed and country-specific studies. A preliminary and conservative estimate is 100 $MtCO_2$/year.

5.5 CO_2 Geological Storage

There is a growing consensus that the geological storage of CO_2 is an important transitional technology for CO_2 stabilization. Its importance is testified by the Carbon Sequestration Leadership Forum, an international alliance of many developed countries including US, which is aimed at promoting the development, demonstration, and deployment of carbon sequestration.

The basic components of the technology – CO_2 separation, transportation and storage – are available. Natural gas storage is a good and reassuring analog; moreover, CO_2 is already transported and injected underground, on a grand scale, for Enhanced Oil Recovery (about 30 $MTCO_2$/year in the US alone).

Significant demonstration projects are underway. In the North Sea, the CO_2 removed from natural gas extracted from the Sleipner field has been continuously reinjected since the year 1996, and, in Canada, the Weiburn project is using CO_2 obtained from a coal gasification unit in North Dakota to increase the oil recovery and eventually to permanently store it. Many other projects are on the drawing board.

The overall cost of CO_2 sequestration is generally high – of the order of 30-40 $\$/tCO_2$ – but several R&D projects are underway to reduce it, in particular the CO_2 Capture Project (CCP), which is a R&D joint-venture among the major oil companies.

The sequestration cost, which is site specific, is drastically reduced under special circumstances. In particular, when the CO_2 is already separated – this is the case when natural gas has to be de-acidified before being transported and used – the separation cost, which is about 70% of the total, is avoided; the same situation occurs with hydrogen production, tar gasification, ammonia and methanol plants, blast fur-

naces. Another condition which leads to reduced cost is the possibility to use the separated CO_2 for enhanced oil or gas recovery.

The above favourable circumstances often occur, even jointly, in oil and gas-producing countries offering golden opportunities for an early deployment of carbon sequestration. A recent study performed by IEA estimates that EOR alone has a potential CO_2 storage of 130 $MtCO_2$/year. Once demonstrated on a large scale, there will be strong incentives to improve and reduce the cost of the technology, paving the way for further growth of the deployment curve.

Power generation, due to economy of scale, will be a primary target for CO_2 capture and storage, with an order of preference staring with natural gas and ending with coal-fired units (the CO_2 emission factor, again, has a strong influence).

Considering the importance of this technology all along the transition from fossil fuels to new energy sources, its early development and deployment where it is more economically viable is a top priority. Its application as CDM projects, in oil-producing countries, would be a further stimulus to the development of the technology. The potential of CO_2 sequestration is very large, since both depleted oil fields and saline aquifers are good candidates for storage.

5.6 Flexible Mechanism

Recognizing that GHG reductions can be a heavy burden for Annex I countries, the Kyoto Protocol introduced a set of market based mechanisms to facilitate compliance:

- IET – International Emission Trading
- CDM – Clean Development Mechanism
- JI – Joint Implementation

For market-based mechanisms to be effective, they should send the right signals to the market and should be implemented so as to generate high volumes of GHG reductions in a short timeframe. In this respect, the present situation of flexible mechanisms is unsatisfactory.

Emission Trading. EU is pioneering, on a grand scale, the trading of

CO_2 emissions. The success of ET requires that caps are allocated to individual installations so as to encourage over-reductions where GHG reduction cost is lower, to an extent sufficient to compensate the under-reductions where GHG cost reduction is higher. Present formulations of National Allocation Plans (NAP) are far from striking this balance. Although the first ET period is experimental, rather generous sectoral caps and contradictory allocation methodologies (e.g. over-allocation to high-emitting installations) would impair the basic ET mechanism.

The approval of the NAPs and, subsequently, the review and harmonization of the allocation methodology foreseen by the ET directive, will give the opportunity to put the ET mechanism on sound basis.

CDM. Clean Development Mechanism became operational late 2001, after the COP-7 in Marrakech. Since then 66 CDM projects have been proposed, generating in the first crediting period (7-10 years) ca. 186 $MtCO_2e$. Only 35.6 $MtCO_2e$ have been approved, corresponding to an annual reduction of about 4.2 $MtCO_2e$/year. Most of the approved projects (Figure 8) pertain to non-CO_2 GHG (methane and hydrofluorocarbons), because they have the advantage of a higher global warming potential in comparison with CO_2. It is clear that the production of GHG reductions is far below the expected demand by Annex I countries (at least 200 $MtCO_2e$/year).

The main obstacles to a more rapid development of the CDM instruments are two-fold: Firstly, the lead time for the approval of a project (Figure 9) is rather long, about 20 months. Secondly, and most importantly, the CDM Executive Board (EB) has introduced significant changes in the requirements for CDM projects, namely the additionality criteria.

Article 12 just requires that GHG reductions must be additional with respect to the no-project scenario. But the recent interpretation from the CDM EB recommends that "a new baseline methodology should include a procedure to assess why the proposed CDM project activity is less likely to occur than one or more of the other possible scenar-

ios." This means that we are moving from the simple environmental additionality to the additionality of the CDM project activity. This is quite a different concept from the environmental additionality, and actually it appears to introduce a substantial amendment to Article 12.

This change has, as a consequence, a drastic restriction of the potential CDM portfolio and it undermines the possibility that CDM will respond to the expected demand of CER. Furthermore, this situation is causing great uncertainties among would-be CDM operators and therefore delays in the proposal of CDM projects. Easing and accelerating the CDM procedure are prerequisites for a productive use of this flexible mechanism.

JI. The operational instruments to activate his flexible mechanism have not yet been put in place by UNFCCC. Although JI projects can earn ERUs (Emission Reduction Units) only as of 2008, their implementation requires lead times of 3-5 years. Therefore all the instrumentation to launch JI projects should already be in place, but this is not yet the case. In addition, it cannot be excluded that JI rules and procedures will be defined in analogy to CDM, which hampers the start-up of numerous and significant projects instead of facilitating them.

Streamlining the procedures related to the registration and implementation of projects based on flexible mechanisms is a distinct need at next COP, if we wish to have efficient and prolific mechanisms to generate GHG reductions that significantly add to the internal measures. This is also a prerequisite for a significant impact of the EU Linking Directive. Should the KP flexible mechanisms remain in the present state of inefficacy, the possibility should be considered for the EU to establish bilateral agreements with countries interested in CDM and JI.

6. Conclusions

The ratification of the Kyoto Protocol announced by Russia will give legitimization and impetus to its full implementation, including the discussion on future commitments in the post-2012 period. It is

probable that many countries that are currently only signatories of the UNFCCC will rush to ratify the Protocol to be fully entitled to CDM/JI benefits, considering that ratification for non-Annex I countries does not imply any commitment, while it will entitle them to full participation in post-2012 negotiations.

The implementation phase should be expected to start in conjunction of a severe, hopefully short-lived, crisis in the price of oil and the other fossil fuels. Therefore complying with the Kyoto target will mean an additional economic burden, which can hardly be afforded. In order to attenuate this burden, while maintaining the original commitments, it is necessary to carefully select the compliance tools, possibly turning the commitments into growth opportunities for industry and the whole economy.

This approach appears to be feasible, provided that the focus of the GHG abatement shifts towards strictly no-regret projects inside European countries, leaving the remaining part of the commitment to GHG reduction projects carried out both in Annex I countries in need of increasing the efficiency of their energy system and in non-Annex I countries.

Priority areas of intervention can be identified, with GHG reduction potentials large enough to cover a substantial part – even more than 50% – of the overall Annex I commitment. Some areas, in particular those aimed at increasing efficiency, can be readily exploited since they are based on existing and proven technologies. In addition they can contribute to boosting the demand for capital goods. Other areas, in particular sustainable renewables and carbon sequestration, require some development and demonstration effort, but they can play a vital role in the transition towards a more sustainable energy system and as part of a response to the requirements of further and more severe GHG reductions in the post-Kyoto period.

It is important to start immediately to negotiate and agree the minimum common basis to call the EU, USA, China, G77 and perhaps even OPEC to the negotiating table and to keep them there.

There will be a strong desire among the pro-Kyoto partisans to

push and replicate the present model that, ultimately, is the only fully enforced international agreement to fight climate change. However, we should avoid any ideological confrontation and continue to assess the scientific, technological, economical, social and political dimension of the problem. In this regard, the CC Science and the CC Technology Program is a path to follow by the EU.

While it may be a great success in raising the awareness of the problem of climate change to the highest possible level, the first commitment period of the Kyoto Protocol with all its bureaucracy, from NAP negotiation to CDM recognition, will achieve very little in term of GHG physical emissions reduction. We must therefore identify and prioritize the most efficient, the largest, and most cost-effective measures to reduce emissions and to sequestrate CO_2 and quickly implement them.

UNFCCC, CDM Executive Board (and an urgent to be installed JI Executive Supervisory Committee) must find ways to facilitate and not to hinder this approach, either through old or new multilateral agreements. Alternatively, a multiplicity of bilateral agreements should be encouraged, with UNFCCC emerging as the guarantor of the methodologies to assess, certify, register, and verify the quality of any credit, ERU, or CER generated by the projects realized under these agreements and then traded in the deepest and broadest net of trading floors.

Note

It is acknowledged that the analysis presented here is at an early stage and that, in view of the importance of post-Kyoto climate policy, the subject deserves further research.

This document was used as a basis for discussion under Chatham House Rules at a meeting with the President of the Council of Environment Ministers sponsored by UNICE and the European Union of Industrial Confederation.

Countries	GHG emission 1990 3rd NC	GHG emission 2000 3rd NC	Kyoto Target (2010)	GHG emission 2010 reference scenario
Australia	503.299	535.252	543.563	580.000
Belgium	146.067	149.943	135.112	165.300
Bulgary	157.700	77.700	145.084	133.700
Canada	607.000	705.000	570.580	770.000
Russia	3.050.000	2.110.600	3.050.000	2.452.200
Finland	76.800	75.391	76.800	89.900
France	565.000	557.909	565.000	577.000
Germany	1.014.500	981.468	801.455	825.018
Japan	1.229.000	1.300.000	1.155.260	1.320.000
Greece	108.620	129.652	135.775	147.206
Italy	508.629	543.751	475.568	575.700
Netherlands	208.582	217.280	196.067	256.000
Poland	564.419	386.187	530.554	394.000
Portugal	61.441	82.256	78.030	99.700
Czech Rep.	192.019	147.681	176.657	131.700
Romania	264.800	148.300	243.616	156.000
Slovakia	72.937	49.165	67.102	53.200
Spain	287.609	387.104	330.750	265.400
Sweden	72.756	68.949	75.666	70.877
Ukraine	883.568	683.000	883.568	683.000
UK	744.139	649.107	651.122	650.000
Hungary	101.633	84.338	95.535	95.600
USA	6.038.000	6.979.000	5.615.340	8.115.000

Table 1: Historical and expected GHG emissions by main Annex I Parties (Source: UNFCCC Third National Communications): All figures in kt CO_2e

		Ref. scenario (Kyoto target)	Gap	Surplus
Annex I				
	Total	2.035.000	3.263.091	– 1.228.147
of which	United States		2.499.000	
	Russian Federation			– 597.800
	Ukraine			– 200.568
	Poland			– 136.554
Annex I (only countries that have ratified)				
	Total	– 501.153	726.994	– 1.228.147
of which	Canada		199.420	
	Japan		164.740	
	Italy		100.132	
	Russian Federation			– 597.800
	Ukraine			– 200.568
	Poland			– 136.554
EU-15				
	Total	252.290	323.551	– 71.621
of which	Italy		100.132	
	Netherlands		59.933	
EU-25				
		– 3.371	327.408	– 330.779
of which	Italy		100.132	
	Netherlands		59.933	
	Poland			– 136.554

Table 2: Expected gaps in Annex I aggregates ($KtCO_2e$) (Source: UNFCCC Third National Communication)

Stabilization of atmospheric concentrations of CO_2 will require emissions reductions globally

Stabilization Level (ppm)	Date for Global emissions to peak	Date for global emissions to fall below current levels
450	2005-2015	2000-2040
550	2020-2030	2030-2100
650	2030-2045	2055-2145
750	2050-2060	2080-2180
1000	2065-2090	2135-2270

These dates are associated with CO_2 stabilization alone – stabilization of CO_2 equivalent concentrations need to occur even earlier because of the contribution of the non- CO_2 greenhouse gases

Table 3: Dates for global emission to peak versus the stabilization level of CO_2 (ppm)
(Source: IPCC Third Assessment Report [Watson])

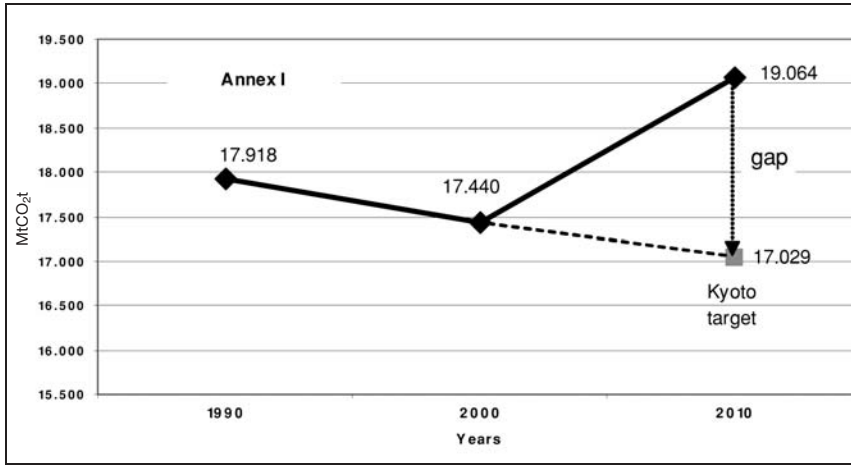

Figure 1a: Emission paths, reference scenario and gaps at 2010: Annex I overall
(Source: UNFCCC Third National Communication)

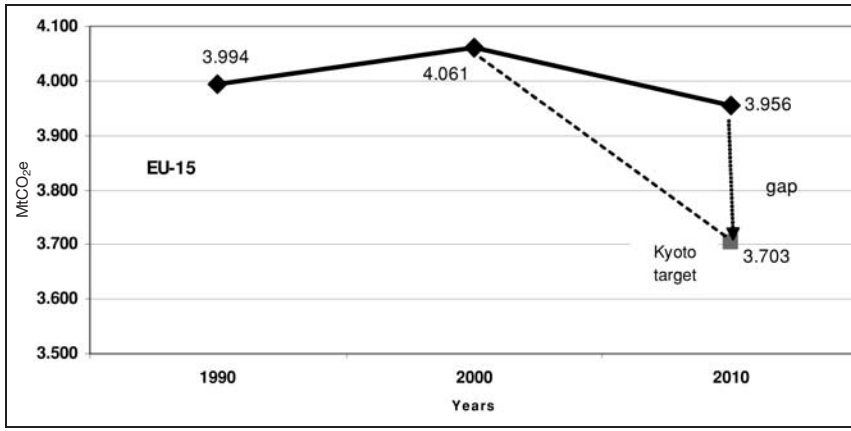

Figure 1b: Emission paths, reference scenario and gaps at 2010: EU-15 (Source: UNFCCC Third National Communication)

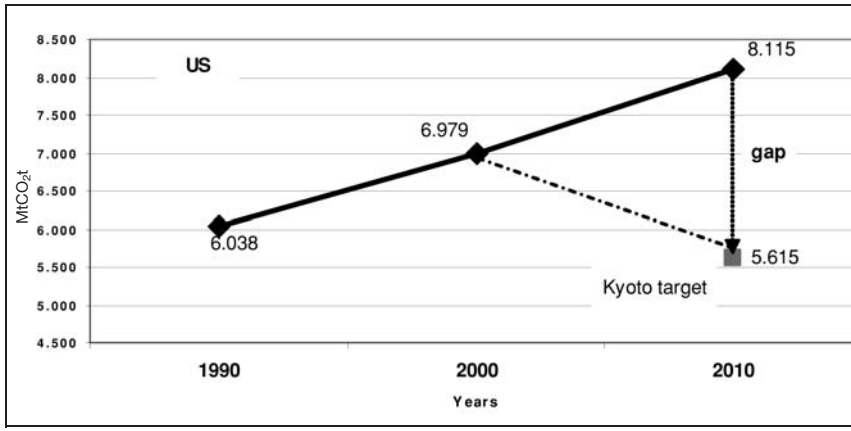

Figure 1c: Emission paths, reference scenario and gaps at 2010: United States (Source: UNFCCC Third National Communication)

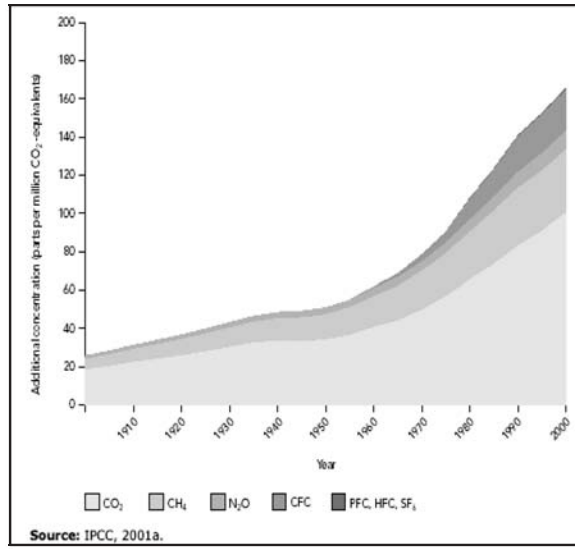

Figure 2: Increase of CO_2 equivalent concentration in the atmosphere (ppm)
(Source: EEA report n.2/2004 "Impact of Europe's changing climate")

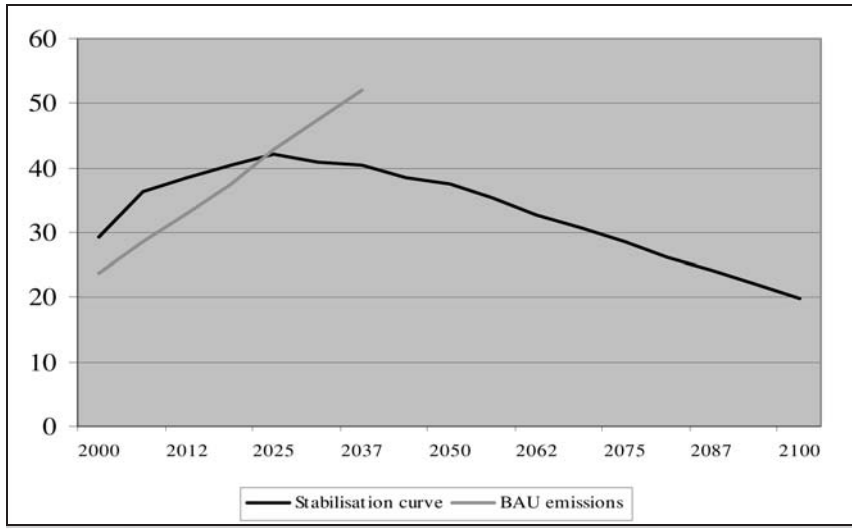

Figure 3: CO_2 stabilisation curve at 550 ppmv and historical and predicted emission curve ($GtCO_2$/year) (Source: IPCC 2001)

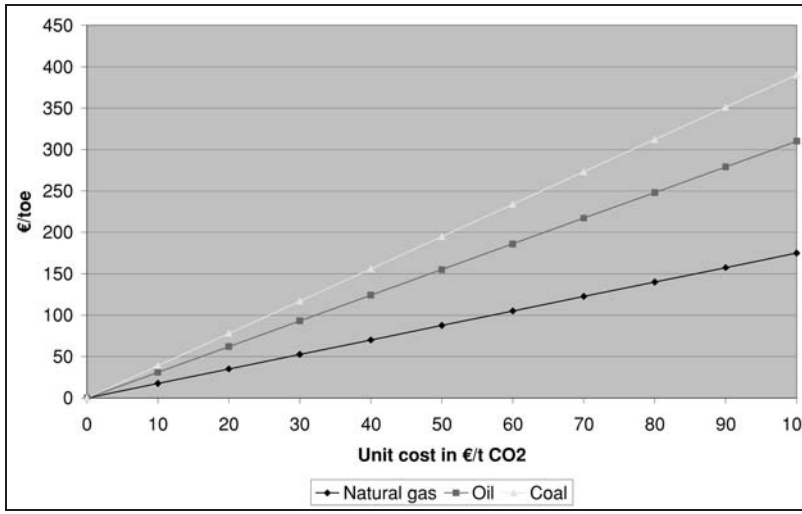

Figure 4: CO_2 cost internalization vs. CO_2 unit cost

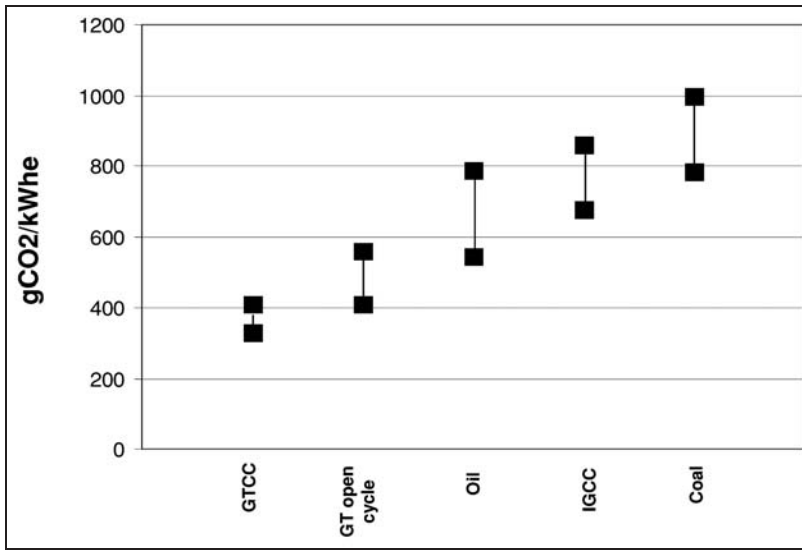

Figure 5: CO_2 emission performances of current power generation technologies
(Source: IPPC Draft Reference Document on Best Available Techniques for Large Combustion Plants - March 2003)

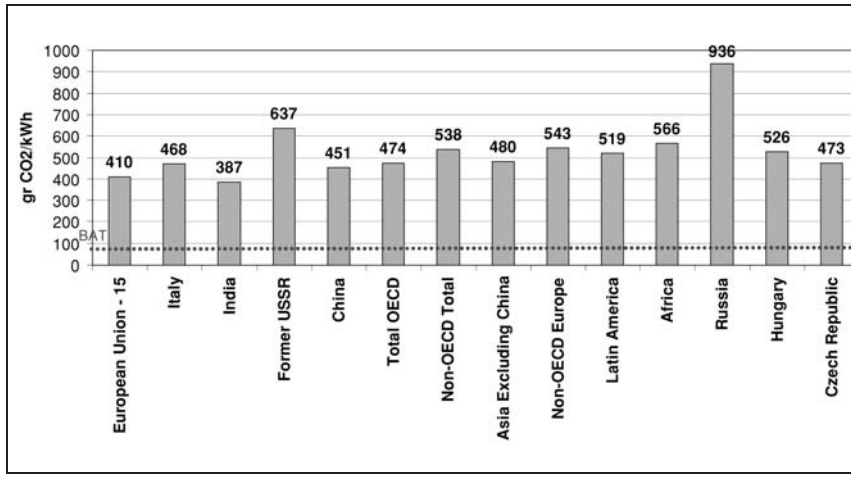

Figure 6: Gas fired power plant: CO_2 emission performance (year 2000)
(Source: IEA "Energy balances of OECD and non-OECD countries" ed. 2004)

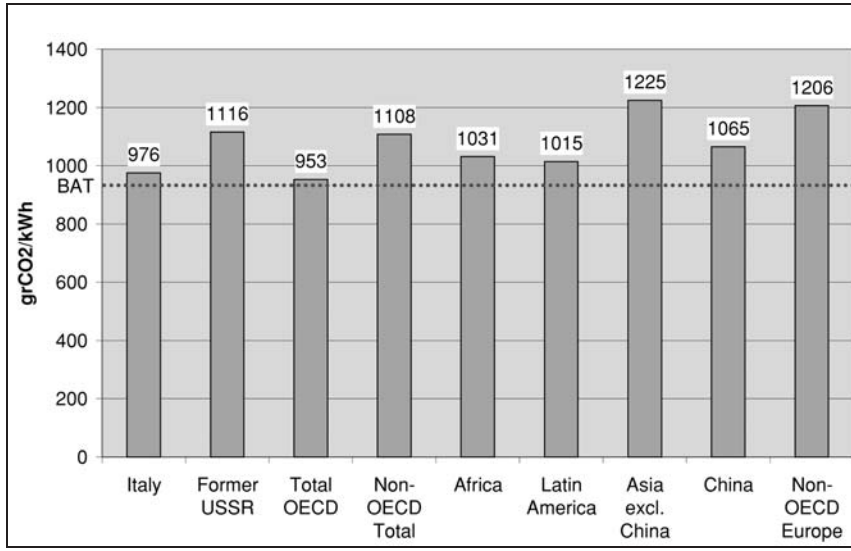

Figure 7: Coal fired power plant: CO_2 emission performance (year 2000)
(Source: IEA "Energy balances of OECD and no OECD countries" ed. 2004)

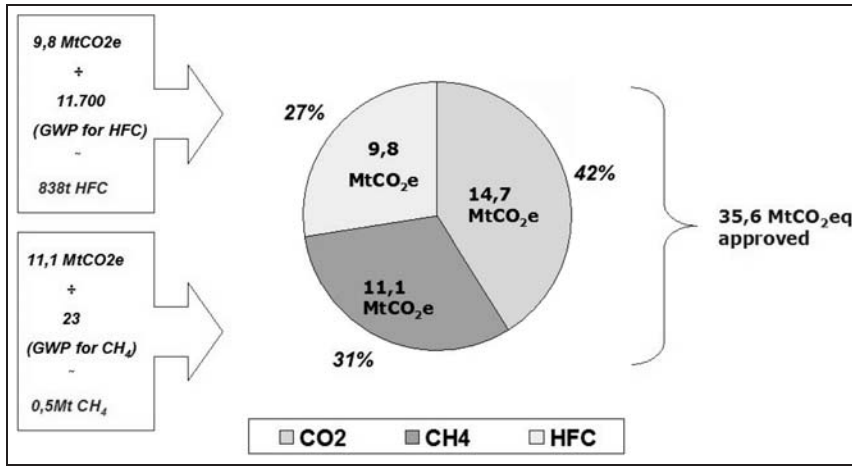

Figure 8: Breakdown of CDM approved methodologies by GHGs

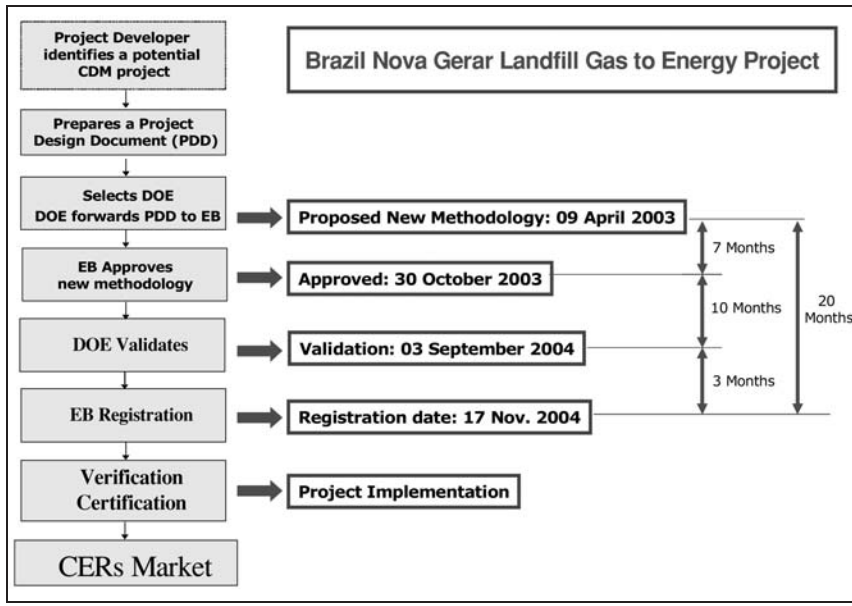

Figure 9: Lead time of a CDM project

WANTED: LEADERSHIP

Alexander Ochs[1]

Introduction

President George W. Bush's withdrawal from the Kyoto Protocol (KP) brought transatlantic differences over climate change to the front pages. Climate change since then has become the symbol of an underlying transatlantic rift with respect to a wider range of global challenges. The disagreement on climate between the traditional partners has been difficult to understand ever since negotiations on the United Nations Framework Convention on Climate Change (UNFCCC) started. It carries dangerous implications for both sides and the globe as a whole. What is needed now is true leadership on both sides of the Atlantic to overcome the divide. Could this momentum be generated, it might set free a positive impetus for other fields of global governance.

Different policies – different emission pathways

The United States is the largest single emitter of greenhouse gases (GHGs). In 2000, U.S. emissions accounted for more than one fifth (20.6 %) of global emissions. The U.S. share is about one third higher than that of the world's second largest emitter, the Peoples' Republic of China (14.8 %) and that of the third-ranking, enlarged EU-25 (14 %).

The EU ratified the Kyoto Protocol in mid-2002. Some variation in enthusiasm among EU member countries should not disguise the fact that the EU as a whole remains unified in support of the KP architecture ("the only game in town") as well as serious efforts at compliance with it. After years of ambiguity about its ultimate decision, Russia ratified the Kyoto Protocol in late 2004 to allow the treaty to become legally binding to its parties. Together with Australia, Liechtenstein, and

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Monaco, the United States is one of only four industrialized states that have not ratified the treaty, with Australia and the US having stated that they did not plan to do so. Indeed the withdrawal of the Bush Administration from a treaty signed by its predecessor is unprecedented in environmental diplomacy. Ultimately, the US has isolated itself from the approach the rest of the world has taken as a consequence of this withdrawal.

Also with regard to recent emission pathways, distinctly different developments have occurred. Except for countries in the EU emissions "bubble," most industrialized countries failed at large to reach the non-binding goal of the UNFCCC to bring their year 2000 emissions of GHGs back to 1990 levels. The EU actually managed to reduce its emissions further by 2002. Still, in a linear continuation of historic GHG reductions since 1990 towards the average Kyoto commitment year 2010, the EU falls short of reaching its 8% reduction target. Kyoto compliance records thereby vary substantially from EU member country to country. Both Germany and the UK – which accepted the biggest share of emission cutbacks – are well in line with their obligations set by the EU's internal distribution scheme. However, some late industrial developers like Spain and Portugal, but also Austria and Italy presently seem out-of-step with their commitments.

The EU-15 therefore implemented an emission trading system in January 2005 among roughly 12 000 European companies. Whether this key strategic instrument, accompanied by premeditated policies at domestic emission reductions and planned measures of the future, will be sufficient to achieve the overall EU reduction goal of -8% is currently debated. But there is a reasonable chance that the EU-15 will succeed in reaching this aim.

Since its withdrawal from the Kyoto process, the US government has not come up with any credible alternative policy, neither internationally or domestically. Aiming at reducing the greenhouse gas intensity of the US economy (i.e. of emissions per unit of GDP) until 2012 by 18%, President Bush's Global Climate Change Initiative of 14 February 2002 intended to "recognize [U.S.] international responsibilities."

However, experts point out that this number is roughly in line with the business-as-usual scenario of the U.S. economy's decarbonization, i.e. this goal might be reached without any political measures. What is more, US emissions in absolute terms are expected to rise further by about 12% over the same period – resulting in levels which are more than 30% higher than the targets to which President Clinton once committed the country in signing the Kyoto Protocol.

A legally non-binding initiative that builds on voluntary agreements with industry, tax reductions for emission-reducing firms and substitutes for R&D, can hardly be called an ambitious program. Consequently, the initiative – announced as an alternative to the Kyoto Protocol – has been received with distinct disappointment internationally. Announced as the U.S. return to leadership on climate change, this plan was particularly disappointing to Europeans because EPA head Christie Todd Whitman, acting on Security Advisor Condoleezza Rice's assurances, had declared only briefly beforehand that the president would live up to his election promise and enact binding CO_2 emission targets for power plants.

One might put more hope in the second aspect of Bush's strategy, the National Climate Change Technology Initiative of 11 June 2001. This initiative put technology R&D, including fuel cells and CO_2-sequestration, at the forefront of the administration's climate policy. But there have as yet been too few tangible results of this approach – barring future technological breakthroughs – to re-establish US credibility in the field.

A review of EU and US climate policy ultimately leads to a result that appears somewhat strange and difficult to explain. The US has had a great impact on the instrumental design of the Kyoto Protocol, which it then refused to implement [2]. The EU became the first Kyoto member to implement an entity-wide emission trading system despite

2. We find similar situations regarding other environmental problems. The UN Convention on the Law of the Sea and the Basel Convention on Hazardous Wastes are other examples where the US managed to largely shape agreements according to its preferences, but to this very date has not ratified it into a legally binding treaty.

the fact that it had long been critical of such an approach. Until the late 1990s it had clearly preferred direct regulation over a market instrument which it considered to be "indulgency trade." The US, a long-standing adherent of market instruments, now pursues climate policy by way of a state-centric money-distribution system reminiscent of traditional planned economies.

Looking Back: European Consensus and Intra-American Dissent

When the US disassociated itself from Kyoto, Europe accepted the call for global leadership on the issue. In order to do so, the EU managed to

a) generate a higher degree of policy cohesion within Europe, and
b) successfully prepare for pending negotiations as a unified actor. Many were surprised to see the November 2001 Conference of Parties to the UNFCCC (COP) at Marrakech not only survive the U.S. retreat but also result in the long-sought implementation rules for the Protocol. In its rescue mission for a decade-long negotiation process, the EU did not hesitate to offer Russia and other countries generous credits for GHG sequestration in order to convince them to ratify the Protocol. A combination of continued pressure, the offer of extended cooperation, most importantly in the energy sector, and support for its WTO bid finally b(r)ought Russia in. On 16 February 2005, the EU and its "climate allies" – most prominently Canada, Japan and relevant UN bodies – celebrated the Protocol's entry-into-force, applauded by the vast majority of developing countries.

To sum up, the EU managed to bundle its members' interests and has used this as an opportunity to assume an international leadership role, which in particular materialized in four major aspects: First, the EU ratified the Protocol at an early point in time. Second, it implemented measures for the treaty's domestic implementation. Third, it supported and pressured other countries to come onboard. Finally, it tried

to engage developing countries diplomatically and financially, in part but not only through the engagement of member countries in CDM projects with the "South."

Interestingly, internal EU consensus and commitment politics contrast diametrically with the U.S. standstill on the issue. The confusion over George W. Bush's abandonment of the Kyoto Protocol often leads observers to overlook the fact that the Kyoto Protocol *never* stood a realistic chance of US ratification. While climate change advanced on the international political agenda, the debates about climate change within Europe and the USA have been conducted in very different ways: While there is a broad cross-party consensus throughout Europe that binding emissions reductions are necessary, hitherto no such agreement exists in the US. There were and still are majorities in the Senate, the House, and the Executive branch that oppose any binding global architecture to control the dangers of climate change.

During both Clinton administrations a rhetorically ambitious White House was consistently blocked by Congress. Half a year before the COP in Kyoto at which the Protocol was prepared, the Senate unanimously passed the so-called Byrd-Hagel Resolution which laid out the conditions any future international agreement on climate change would have to meet in order to be ratified into domestic law[3]. As a consequence the Clinton administration had to significantly tone down its Kyoto negotiation position. After the summit, Congress repetitively accused the president of striving for an implementation of Kyoto "through the back door." It therefore watered down or declined any White House climate initiative[4]. At subsequent COPs, members of Congress organized press conferences to oppose statements by the Administration. As a consequence Clinton never submitted the Protocol to the Senate for ratification. Including in the ranks of academia,

3. In particular that the US should abstain from any international treaty that a) does not include binding commitments by developing countries, or b) poses a threat to the US economy.
4. To give only one striking example, House Resolution 4194 for fiscal year 1999 did not only explicitly ban any measures aiming at the Kyoto goals; it even suspended any publicly financed information campaigns relating to climate change.

think tanks, other NGOs, and the media, the country appeared so divided on the issue that the Administration refused to put its political weight behind any far-reaching climate protection measures.

With George W. Bush's inauguration as president, the initiative in US climate change policies shifted. Opposing Clinton's standpoint, the new president emphasized that the consequences of global climate change were still too uncertain. He also echoed the position of Congresses during the late 1990s that the major developing countries – in particular China, which plays a pivotal role in the US discourse – ought not to be given a free ride from substantive obligations to limit their emissions. In the absence of White House leadership, Congress and the states have tried to fill the vacuum. Climate policy proposals in recent years originating in both houses of the US Congress are impressive – unfortunately thus far only in numbers, not in substantial results [5].

The most prominent and far-reaching bill was introduced in the Senate on 8 January 2003 by Senators Joseph Lieberman and John McCain. Their Climate Stewardship Act would put a national cap on US GHG emissions and implement the trade of emission rights. The bill was defeated in the Senate by 43 to 55. Yet, this result was better than even the sponsors expected. Key policymakers such as Senate Foreign Relations Committee Chair Richard Lugar crossed party lines to support the bill. Senators McCain and Lieberman have therefore announced that they will continue to reintroduce the bill.

European observers tend to focus narrowly on U.S. policy as the actions of the federal government. However, states such as California, Oregon, New Jersey and the New England states have been at the forefront of pushing for climate policy coalitions in the United States. California State Assembly Bill No. 1493 of July 2002, for instance, calls for substantive reduction of CO_2 emissions from vehicles. Under their

5. An early overview has been conducted within the INTACT network: Harnisch, A., Developments in U.S. Climate Policy since the Inauguration of George W. Bush, Project paper, August 2002, available online at www.intact-climate.org. A more recent overview is given by Yacobucci, B. D. and K. Powers. 2005. Climate Change Legislation in the 108th Congress (CRS Report for Congress): Congressional Research Service.

Regional Greenhouse Gas Initiative, six New England states plus the Eastern Canadian provinces have pledged to establish a GHG emission inventory as basis for a cap-and-trade scheme similar to that of the EU[6]. Its operation is planned to start in 2008 at the latest. The states have even tried to influence the national government's international stance. For example, California's Senate Joint Resolution 20 of September 2002 emphasized the need for the US to ratify the Kyoto Protocol. Also, below the state level, there are a remarkable number of effective local initiatives springing up throughout the country.

Clearly, such local and regional initiatives should be seen as valuable *components* or *supplements*, but cannot succeed as *substitutes* for an effective federal and international climate policy. So far, however, all important proposals on the federal level have failed due to both resistance within Congress and clear opposition by the President. Fifteen years of national U.S. climate change policy have resulted in little more than a few research and technology programs. With still rapidly escalating GHG emissions, the United States remain the climate policy outsider as which they have been seen from the beginning of climate negotiations.

Looking Forward: Transatlantic Climate Leadership as an Opportunity

Most experts value the Kyoto Protocol as the most important international environmental regime thus far. But there can also be no doubt that the Protocol only marks a first and fairly small step towards preserving the Earth's climate system from a dangerous change. In the most recent IPCC report of 2001, the panel warns of an increase of the Earth's average surface temperature by 1.4 to 5.8C until the end of the century, should no additional measures be taken. A US National Academy of Sciences report of the same year endorsed these alarming

6. The states are Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont. In addition, Maryland, the District of Columbia, and Pennsylvania are "observers", as are some Eastern Canadian states.

findings. At the same time, a reversion of *global* emission trends is anything but in the offing. To the contrary, world GHG emissions are still growing at a fast rate. The IEA forecasts a 90% increase of emissions by the year 2030 and a further escalation beyond this date should no effective measures be taken soon.

The different stance of the traditional Atlantic partners on climate change has always been difficult to understand. For example, by the time the Kyoto details were negotiated in the late 1990s, economic assessments resulted in roughly equal cost scenarios for a treaty implementation in both societies [7]. Therefore, the divide can only be understood in different and not purely economic terms: The discourses within both societies, but in particular within their political elites, have been conducted in very different ways. More than being concerned with the minute details of treaty negotiations, the differences evolved around debates over the overall urgency of the problem, acceptable approaches to global fairness and generational equity. These differences might indeed be central to an overall widening transatlantic rift and paradigmatic in how differently we perceive the global policy challenges of the 21st century and their acceptable solutions.

Seen from this point of view, however, the topic would also stand out if both partners succeed in overcoming their differences. After all, any global climate regime has to relate environmental to development goals – what, in practice, is far more demanding than the rather simple nature protection agreements of the past. In light of a global economy vastly dependent on the generation of fossil fuels, the challenge is enormous. But in the long-run, there is simply no alternative to confronting to the challenge – including its normative, economic and organizational side. Climate policies can and should be rethought and renovated. It is precisely due to the enormity and the cross-cutting implications of the topic that climate change – or more particularly,

7. Admittedly, an implementation would have been slightly more expensive for the US. But not only had the US accepted its targets and a maximum flexibility on the instrumental side been generated at their request. The cost differences are too small to explain the enormous differences in positions between political leaders and opinion makers on the two sides of the Atlantic.

a revision of the world energy path – carries the potential to demonstrate that there is little that cannot be done if America and Europe stick together and form alliances around a political desideratum. With a strong impact on other governance topics, climate change could become an issue where the Atlantic community demonstrates that it adheres to principles it has designed in cooperation with others.

In contrast to its overall weak foreign policy performance, the EU has been successful in establishing climate change as one important topic outside trade where the EU holds a leadership position. But rather than accepting equal responsibilities, the US shied away. Europe now has to face the fact that there is no return of the US into Kyoto's first assessment period. That is where new negotiations have to start. Reopening negotiations on a "Kyoto light" would inevitably water down the existing commitments and mean a serious credibility loss for, amongst others, Europe, Canada, and Japan. Equally important, it would call into question the UN as an effective institution in this field.

There are recent developments in Europe, however, that question the ability of the EU to hold its leadership position in the future. Some EU members dispatched support of a further advancement of both domestic climate policies as well as the global architecture [8]. Europeans have to make a decision: Either they stay united in supporting a progressive climate policy stance, or they will give up one of their few international leadership positions. If, for example, the EU wants to push renewable energy as an alternative to the carbon economy, it has to set ambitious and specific long-term goals and demonstrate how these will be met. Thus far, the programs that have been set up to assist renewable energy development are not sufficient.

In the meanwhile, important US actors have come to see the problems of its elite dissent on important global issues. In May 2004, Se-

8. To give just two illustrative examples: The National Allocation Plans for the European emission trading scheme in some member countries were politically astute as they used the lack of clarity over the ratification of the Kyoto Protocol by Russia as an excuse to initially over-allocate emissions nationally. The EU was also unable to enter the Bonn Renewables Conference of 2004 with a longer-term numerical goal on its own.

nator Lugar stated that "the United States has repeatedly failed to exert the leadership necessary to conform multilateral treaties to important U.S. interests. The result has been problematic agreements like the Kyoto Treaty [...] that lack sufficient support in the United States and divide us from our allies. Partisan posturing continues over whether to support these treaties, when the real question is why the United States [...] cannot negotiate satisfactory agreements that would be supported both at home and overseas."

In its third report to the UNFCCC of 2002, the US officially acknowledged for the first time that human activity was the primary culprit for climate change [9]. Apart from its role as a major emitter, the US is also a potential leader in developing technologies to deal with the causes and effects of climate change. These characteristics make the US close to indispensable in the long run for dealing with global climate change. The world therefore urgently awaits US reengagement in transatlantic and global climate negotiations. Only domestic leadership can overcome US internal divergences and enable a return to the international negotiation table. Europe, in the meanwhile, should demonstrate that GHG emissions reductions can be achieved without too much harm to economic growth. It should also forge climate and energy coalitions with the willing in the US.

Ultimately, Europe and the United States have to come up with a program that goes far beyond Kyoto and credibly constitutes a major step towards keeping the climate from a "dangerous" change – following the postulate the UNFCCC, Art. 2 to which both entities repeatedly committed themselves [10]. No one should presume that the recipe for a transatlantic climate renaissance is not yet on the table. Within the three years of its existence, the INTACT project has proposed a broad catalogue of options for transatlantic climate and energy policy rap-

9. President Bush later denounced the report as a "product of the federal bureaucracy" and declared that he did not concur with its assessments. Recent announcements, however, indicate that the White House is increasingly accepting the idea of human responsibility for climate change.
10. Article 2 stipulates that "the ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve [...] stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

prochement – ranging from a set of general policy principles to a blueprint for a long-term approach and propositions for more specific aspects of the challenge. What is needed now is true leadership entrenched in firm commitment on both sides of the Atlantic.

The fora for dialogue on transatlantic reengagement have been established. But it seems fair to state that the US has not yet accepted the call for intense cooperation. Both the Administration and Congress still do not consider the topic important enough to join forces with the rest of the world. European parliamentarians, for example, feel increasingly embarrassed at finding their American counterparts absent from transatlantic meetings on climate change. The EU has made clear repeatedly that it considers climate change to be one of the most important topics of the future. Prominent commentators have translated this into the vocabulary of hard politics and pointed out to the US that the EU regards the prevention of a climate crisis key to its economic and security interests. This message has to be further carried forward on *all* political levels.

It is absolutely essential that the top echelons of government engage in climate policy. In light of the enormous risks of an uncontrolled climate shift as well as the potential benefits of a change of the energy production path, it is urgent time that our leaders now, after all, show true leadership. The announcement of the UK to put climate at the center of its G-8 presidency is an important move in the right direction. The establishment of a "climate Davos," in the style of or as a key part of the World Economic Forum, is another valuable idea carried forward within the INTACT initiative. Climate change cannot be tackled if it is framed rather simplistically as a subtopic of the nature protection theme to be dealt with principally within the ranks of environmental experts and bureaucrats. We need the initiative and vision of those chosen to lead us and secure our welfare. Mr. Barroso, Mr. Berlusconi, Mr. Blair, Mr. Chirac, Mr. Jeffords, Mr. Lieberman, Mr. Lugar, Mr. McCain, Ms. Rice, Mr. Solana, Mr. Schröder – and Mr. Bush: Bring these emissions down!

Note

Sections of this paper draw, in part verbatim, on Ochs, A. and D. Sprinz. Europa Riding the Hegemon? Transatlantic Climate Policy. In: Challenges to U.S. Policy Preferences: Strategies of Resistance and Modification, eds. Bobrow, D. and W. Keller (forthcoming); Busby, J. and A. Ochs. From Mars and Venus Down to Earth: Understanding the Transatlantic Climate Divide. In: Climate Policy for the 21st Century, ed. D. Michel. Washington D.C. 2005; as well as Ochs, A. and M. Schaper, Konflikt statt Kooperation? Die transatlantischen Umweltbeziehungen. In: Transatlantische Beziehungen, eds. Jäger, Thomas et al., Wiesbaden 2005 (forthcoming).

SECURITY OF ENERGY SUPPLY AND CLIMATE CHANGE IN THE EU: SETTING THE STAGE

Michael Wriglesworth[1] *and Christian Egenhofer*[2]

Summary

The EU's short-term policy response to climate change has been to embrace the Kyoto Protocol, which can be explained by the largely synergistic relationship between the EU's natural gas supply situation and other EU policy objectives, such as power and gas market liberalisation. Moreover, weak EU competencies in the areas of energy policy and security of supply in combination with relatively strong competencies in the fields of market liberalisation and the environment have forced the EU to frame climate change responses in the context of energy efficiency and conservation rather than in energy policy logic.

Climate change policy has been coined as a 'win-win' situation with regards to security of supply, higher efficiency, more competition and co-benefits through reduction of local pollution. Although distributional issues have already been raised in the initial phase of climate change policy formulation and especially in the first phase of the EU emissions trading scheme[3], the EU may be considered to enjoy an overall 'comparative advantage' vis-à-vis the EU's main trading partners. This 'win-win' situation can also explain to some extent the generally supportive mood found in European energy industries for EU climate change policy.

In the longer-term, i.e. beyond 2012, this comparative advantage will gradually weaken and be replaced by a need to make 'hard choices', thereby exposing these tensions over distributional ques-

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3. As documented, for example, in Egenhofer et al., Business Consequences of the EU Emissions Trading Scheme, CEPS Task Force Report No. 53, Centre for European Policy Studies (CEPS), Brussels, February 2005.

tions. As longer-term EU targets can only be met by the development and the massive diffusion of new and existing technologies, a greater focus on technology will need to be developed in the EU. This offers the possibility of greater convergence in thinking between Europe and the US, where the focus on technology is already apparent.

Introduction

The current EU perspective on security of energy supply and climate change is strongly related to a generally favourable supply situation regarding natural gas, making it possible to achieve short-term EU climate change targets combined with limited EU competencies in energy policy and security of supply.

The boundaries of EU energy policy competencies

To understand EU energy policy, it is helpful to realise that its formulation is generally subject to stricter boundaries than are imposed on national energy policies. For more than 50 years, EU energy policy has in principle been confined to the narrow fields of nuclear energy and coal, deriving its authority from the treaties on the European Coal and Steel Community (ECSC) and on the European Atomic Community (Euratom) [4].

Periodic attempts to extend the EU's jurisdiction in times of real or perceived threats to energy supplies have been unsuccessful. Repeatedly, member states have refused to accept an energy chapter in the EU's most important treaty, the Treaty on the European Community (TEC), most recently so in Maastricht (in 1992) and Amsterdam (1997) – although the Maastricht summit agreed on a legal 'foot-in-the door' [5]. But this by no stretch of the imagination created an EU competence in the field of energy.

Despite strong support from the European Commission and the

4. The latter treaty expired in 2002, although its material provisions have been added to the existing EC Treaty.
5. The new Article 3(u) of the "Treaty on the European Community" added "measures in the field of energy as legitimate Community activities".

European Parliament, the majority of member states are loathe to lose their real or perceived autonomy over energy policy. The main reasons have been differences in interests between producer and non-producer countries as well as the different structures of national energy sectors, which is nowhere better exemplified than in the organisation of network energy industries and vast differences in the energy mix across member states. While France relies on nuclear power to meet about 80% of its power demand, more than half of the EU member states have shunned nuclear power.

The new Constitutional Treaty tries to rectify this by introducing an energy chapter, which by default means that the EU can take decisions on the basis of a qualified majority [6]. The impact of this chapter however is likely to be limited. It is far from certain that the Constitutional Treaty will ever come into force as it must be ratified in all member states and in many, through a referendum. More important is the fact that the Constitutional Treaty continues to exclude from qualified majority voting all areas that affect member states' choices between energy sources.

EU energy policy is driven by the environment and market liberalisation

Nevertheless, the lack of an energy chapter in the Treaties has not meant that the European Union has been absent in European energy policy. Other competencies conferred on the EU via the treaties have allowed the EU to play an active part in energy policy and, by extension, security of supply. Most important in this respect have been the competencies on the internal market and competition policy, which have successfully been applied to open energy markets, starting with oil products and procurement, and currently with electricity and gas. Similarly, the environment has often been the legal base for EU initiatives in energy policy. The growing economic and political interde-

6. This condition changes as of 2009, when a measure would be adopted if a sufficient number of member states agree representing both 50% of the member states and 65% of the population.

pendence of member states resulting from deepening integration (e.g. the internal market including energy, monetary union and common foreign and security policy) or international environmental agreements, such as the Kyoto Protocol, are increasingly leading to a convergence of EU member state policies in further areas, including energy policy.

Energy efficiency as security of supply policy

Energy efficiency and conservation measures were identified in 2000 in the European Commission's Green Paper on security of supply [7] as the first priority of EU policy on security of supply and on energy in general. Increased energy demand is seen as placing the EU in an unfavourable position of exposure to a market that may face supply disruption. Energy efficiency is a way of mitigating that potential problem.

As a consequence, the Green Paper states, "the Union must rebalance its supply policy by clear action in favour of a demand policy" (p. 3) and designates energy efficiency as the first pillar of security of supply. As a side benefit, energy efficiency was identified as a means to reduce import dependency, although that case is not as clear cut as the European Commission has presented it. The European Parliament is not alone in finding that "being dependent on imports is neither necessarily a bad thing nor economically inefficient provided the sources are diverse, no one supplier is dominant and we can produce sufficient goods and services to pay for them" [8]. Other experts [9] have made the case that high import dependency can be managed by adequate mechanisms to achieve a more stable balance. The use of market-based mechanisms may even enhance competition in the internal electricity and gas market.

7. European Commission, Towards a European strategy for the security of energy supply, COM (2000) 769 of 29 November 2000.
8. European Parliament, Report on the Commission Green Paper towards a European strategy for the security of energy supply [COM(2000) 796 - CS-0145/2001/2071 (COS)], Committee on Industry, External Trade, Research and Energy, 17 October 2001, Rapporteur: Giles Chichester (p. 17).
9. Luciani, G, Security of Supply for Natural Gas: What is it and what is it not?, INDES Working Paper No. 2, CEPS, Brussels, 2004.

EU security of supply conditions

Market liberalisation and integration have transformed the traditional notion of security of supply in the EU and elsewhere. Within competitive markets, firms in principle invest in those technologies that promise the highest return on capital, which has meant that the power generation sector favours the solution with minimum capital investment and the fastest returns. A result of EU electricity and gas market liberalisation has been a dash for gas, mainly in the form of combined-cycle gas turbines (CCGT) and combined heat and power (CHP), to the detriment of more capital-intensive generation technologies. The EU emissions trading scheme is another driver behind the use of gas.

As regards security of supply, whereas Europe depends upon a diversified stable supply from international oil markets, stability of gas supply is much more regional and dependent on infrastructure. The EU strategic position in natural gas is profoundly different from that of the US: According to European Commission data, 80% of global gas reserves are located within economic transportation distance to the EU, compared to around 10% for the US. These reserves would cover the Eurasian demand for 50 years. Hence coal to gas switching is a viable short-term policy for the EU. According to the International Energy Agency (IEA), the share of gas in power generation is projected to more than double in the period from 2002 (15%) to 2030 (35%) [10]. The European Commission does not rule out the possibility that 40% of total electricity will be produced from natural gas by that same time. Fuel switching from coal to gas is a way of meeting the Kyoto Protocol's targets in a cost-effective way, and in fact is a result of EU gas and power market liberalisation. This represents a major difference from the US experience, where the coal share in power generation is expected to remain almost stable, accounting still for 48% in 2025 [11]. As a result, while in Europe natural gas will continue to be the

10. International Energy Agency, World Energy Outlook 2004. IEA/OECD Paris, 2004.
11. Energy Information Agency, Annual, Energy Outlook – With projections to 2025. US Energy Information Agency (EIA), Washington, D.C., 2003.

bridging fuel to achieve short-term targets, this is less of an option for the US. Climate policy will put pressure on coal. Any US alternatives short of deploying 'carbon capture and storage' would increase concerns about security of supply.

Stakeholders

Against the background of minimal trade-offs – at least in a short-term perspective – between climate change, security of supply and market liberalisation, it should not come as a surprise that the energy sector has been broadly supportive of EU climate policy approaches. Companies have been ready to build these constraints into their strategic business plans. A modest carbon constraint, especially when implemented through the EU emissions trading scheme based on free allocation, has been seen in business circles as enhancing efficiency and even security of supply, as many energy savings measures come at a low or even negative cost. An important element in achieving business acceptance and support was the European Climate Change Programme (ECCP)[12], a multi-stakeholder consultation process. Established in 2000, the ECCP consisted of several working groups (i.e. EU institutions, member states, business and industry, environmental NGOs, etc.), which were supported by expert input including economic modelling.

Given that medium-term targets will be more constraining, thereby requiring more radical changes and leading to greater distributional consequences, this relative consensus among stakeholders may come under pressure. This can already be witnessed during the emerging discussions on the post-2012 EU strategy, as well as on the future of the EU emissions trading scheme[13].

12. European Commission, European Climate Change Programme, Report, June 2001.
13. See two forthcoming CEPS multi-stakeholder Task Force reports that analyse these issues: Egenhofer et al., Towards a coherent EU climate change strategy for beyond Kyoto: How the EU can provide international leadership; and Egenhofer et al. (2005), Adapting the EU emissions trading scheme to the post-2012 strategy, CEPS, forthcoming 2005.

Technology outlook

The EU has chosen to express the UNFCCC stabilisation target in the form of limiting a global average temperature increase to a maximum of 2C, although it is uncertain whether this target would be sufficient to actually avoid 'serious consequences'. Meanwhile, several member states have repeatedly expressed long-term aspirational commitments, which usually speak of GHG reductions in the EU of up to 50% or even 60% by 2050 – as compared to 1990 levels.

Most interestingly, in its post-2012 Communication, the European Commission focused on what it calls 'the participation challenge' of engaging other major emitters in parallel actions. The issue of longer-term targets certainly will have to be addressed in an UNFCCC context, and the EU emissions trading scheme will continue after 2012 and will need targets to be set and delegated to industrial installations.

As one example, one scenario from the World Business Council for Sustainable Development (WBCSD) - using IPCC and IEA data - estimates that in order to achieve stabilisation of CO_2 concentrations at a level of 550 ppm in 2100 – although there has not been any IPCC final recommendation about a level of stabilisation – there would need to be at a minimum a total reduction by 2050 of global carbon emissions from a total of 15/16 Gtons [14], which would be expected in a business-as-usual scenario, to around 6-7 Gtons, (i.e. by around 40%) [15].

If a target around 550 ppm were to be confirmed as needed in order to avoid 'dangerous climate change', there would be a need to deploy existing proven technologies in both the developed world and high-growth developing countries, while simultaneously developing the new 'breakthrough technologies'. From an EU perspective, development of new technologies is seen as having a positive side-effect of reducing dependency on OPEC. As the European Commission's

14. 1 Gigaton is 1 billion tons; carbon equals approximately 3 times CO2.
15. World Business Council for Sustainable Development (WBCSD), Facts and trends to 2050 - Energy and climate change, 2004.

Green Paper on security of supply in 2000 (p. 38) remarks, "In the long term, it will be technological developments that pose the principal threat to OPEC, namely, new production techniques in difficult areas, using non-conventional oil, and the development of new fuel substitutes and the associated technologies, chiefly in the transport sector."

APPENDIX

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Villa Vigoni, Loveno di Menaggio, November 19-21, 2004

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November 19, 2004

7:30 pm	WELCOME REMARKS *Speaker: Aldo Venturelli*
8:00 - 9:30	WORKSHOP DINNER Dinner speech: "US Climate Policy after the Presidential Elections: Continuity and Change" *Speaker: Richard Benedick*

November 20, 2004

9:00 am	OPENING REMARKS
9:15 - 9:45	Keynote addresses *Speakers: Fabrizio D'Adda, Mara Angeloni*
9:45 - 10:15	Briefing: "The Beginning of Negotiations for the Post-2012 Period" *Speaker: Karsten Sach*
10:15 - 10:45	Briefing: "UK's G8 Objectives for 2005" *Speaker: Sarah Hendry*
10:45 - 11:00	COFFEE BREAK
11:00 - 12:15pm	Session 1: **Innovation** *Chair: Alexander Ochs* *Discussants: Kevin Fay, Richard Sellers, Ernst Ulrich von Weizsäcker*

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Transatlantic Dialogue on Climate Change
Villa Vigoni, Loveno di Menaggio, November 19-21, 2004

12:15 - 1:30	Session 2: **Emissions pathways: Investments and opportunities** *Chair: Ernst von Weizsäcker* *Discussants: Carlo Jaeger, Susannah Foster*
1:30 - 3:00	LUNCH
3:00 - 4:15	Session 3: **Energy security** *Chair: Baroness Nicholson of Winterbourne* *Discussants: Edward Chow, Michael Wriglesworth, Friedemann Müller*
4:15 - 4:30	BREAK
4:30 - 5:45	Session 4: **Options for negotiation and coordination** *Chair: Richard Benedick* *Discussants: Scott Barrett, John Ashton*
5:45 - 6:00	Closing remarks
6:30 - 8:30	CONCERT AND RECEPTION

November 21, 2004

9:00 am - 10:30	INTACT 2005: Strategic planning session

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