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GCC [Global Climate Change] Trading Restrictions [Binder]

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RESTRICTION CODES

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- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
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LETTERS TO THE EDITOR

No argument against restricting emissions trading

From Mrs Margot Wallström.

Sir, Your editorial "Global warring" (November 5) gives three reasons why the European Union's proposal to limit the use of emissions trading should be rejected. Yet none of these reasons holds good.

First, you argue that emissions trading would be "much the most efficient way of securing the global CO₂ reductions planned in Kyoto". The problem here is that trading the surplus allocations made in Kyoto to Russia and Ukraine entail no CO₂ reductions at all compared with what they

would do anyway. On the contrary, huge transfers of so-called "hot air" that Russia and Ukraine would not otherwise be able to use will be worse for the environment than if there were no trading.

Your second argument hinges on there being "partnership agreements" with developing countries. The Clean Development Mechanism is specifically designed to foster projects that are both good for the environment and good for sustainable development. But the availability of huge amounts of

very cheap "hot air" permits risk killing the CDM at birth. Businesses will go for cheap permits rather than projects. The big losers will be developing countries and the environment.

Finally, you suggest that emissions trading should not be restricted because "unrestricted trading" is a condition for US ratification. If parties were all to come to The Hague next year with the attitude that there will only be a deal on their terms, then there is indeed cause for concern. I am sure that the US recognises that the success of

these complex negotiations on climate change ultimately depends upon both the willingness of industrialised countries to act and upon the continued participation of developing countries. A reasonable limit on the extent of emissions trading recognises the interrelationship of these two dimensions.

Margot Wallström,
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*European Union***GENERAL SECRETARIAT
OF THE COUNCIL**

Luxembourg, 17 June 1998

*EU Burden-sharing
Arrangement***MEETING DOCUMENT**

**Subject : Community strategy on Climate Change
- Council conclusions**

Council conclusions

1. The Council recalls its conclusions of 23 March 1998 on the question of the contribution of each Member State towards the reduction of 8% in greenhouse gas emissions to be achieved by the Community as a whole under Article 3 of the Kyoto Protocol, utilising the provisions of Article 4 on joint fulfilment of the commitments under that Article.
2. The Council has now agreed the determination of the contributions of Member States to the 8% reduction and the commitment of each Member State is set out in Appendix 1 to these conclusions. The terms of this agreement will be included in the Council Decision on the conclusion of the Protocol by the Community. In accordance with Article 4 of the Protocol, they will also be notified to the secretariat to the Framework Convention on Climate Change at the time of ratification of the Protocol by the Community and its Member States.
3. The Council considers that this agreement underlines the continuing commitment of the Community and its Member States to fulfil the commitments under Article 3 of the Kyoto Protocol. It reaffirms that domestic action, which in a Community context includes action at Community level, should provide the main means of meeting those commitments for all Annex I Parties. Emphasising its conclusions of 23 March 1998 that the modalities, rules and guidelines for the operation of flexible mechanisms should ensure that they do not undermine this principle or weaken the commitments under Article 3, the Council considers that mechanisms established by Articles 6, 12 and 17 of the Protocol would have a role to play in supplementing domestic actions.

- 3bis In considering paragraphs 1-3, the Council has taken note of the result achieved by the Subsidiary Bodies of the COP at their recent meeting in Bonn and the position taken by the Community on land use change and forestry.
4. The Council recalls and reaffirms its earlier conclusions on common and co-ordinated policies and measures (CCPMs), and in particular its conclusions of 23 March 1998 which emphasised the importance of the further elaboration and implementation of CCPMs as a necessary contribution to enable the Community and its Member States to achieve the Kyoto target, together with, and as a complement to, national policies and measures.
 5. The Council notes that, since the Community acceded to the UNFCCC, further common and co-ordinated policies and measures have been agreed in addition to those existing at that time, including in particular measures on energy labelling, minimum performance standards for certain domestic appliances, and the directive on Integrated Pollution Prevention and Control which will have effect after 2000. The Council recognises that these and other existing measures will all contribute to reduction and limitation of emissions of greenhouse gases in Member States, but that further common and co-ordinated measures will be required.
 6. Achieving the Kyoto target will require major changes in the way energy is generated and used. The Council welcomes the presentation of the Commission's Communication on energy efficiency in the European Community, the general thrust of the White Paper on renewable sources of energy, and the Communication on Combined Heat and Power. These should be used as a foundation for strategically developing common, co-ordinated, and national policies and measures to reduce greenhouse gas emissions. In this context the Council also takes account of the importance of Trans-European Energy Networks, especially given the need to improve the availability of less carbon intensive fuels. The Council recalls its conclusions of 11 May 1998, which stressed the importance of integrating environmental objectives within the framework of overall energy policy both at national and Community levels and in the operation of Community energy markets. These conclusions identified priorities for action in the development of CCPMs in the energy field.
 7. The Council emphasises the importance of limiting and/or reducing emissions of carbon dioxide from transport in view of the projected strong growth in transport volume. It welcomes the Commission's communication on transport and CO₂ and looks forward to further discussion on the proposals it contains.
 8. The Council recognises the role that economic instruments can play in reducing greenhouse gas emissions. In this context, it welcomes the discussions in progress on the proposed Directive restructuring the Community framework for the taxation of energy products.
 9. The Council notes with interest the presentation of the Commission's communication "Climate Change towards an EU post-Kyoto strategy". In developing a post-Kyoto strategy, it looks forward to early discussion of this communication.

10. The Council confirms that early and substantial progress on effective common and co-ordinated policies and measures, which will need to take account of the differing circumstances of Member States, is essential in order to assist Member States to meet the commitments agreed in paragraph 2 above. In order to enable it to make substantial progress on common measures prior to ratification of the Kyoto Protocol, it urges the Commission to take forward, with a view to early adoption by the Council, in particular the common policies and measures set out below, building where appropriate on the experience of action in Member States, while having regard to subsidiarity and paying particular attention to the potential contribution to greenhouse gas emission reductions in the period 2008-2012, costs and benefits and the implications for industrial competitiveness. The Council agrees that progress will be evaluated on an annual basis. An overall evaluation will take place in 2002 with a view to significant progress by 2005 in accordance with the Kyoto Protocol.

- i) The Council reaffirms the importance of reducing CO₂ emissions from passenger cars. In this context, the Council welcomes the progress in the Commission's negotiations with ACEA, and emphasises the importance of rapid conclusion of an agreement and development of a strong monitoring system in the light of the Council conclusions of 23 March 1998. It recalls its conclusions of 25 June 1998, which noted inter alia that a fuel economy labelling system would be required to support and complement an agreement with industry, and encourages the Commission to bring forward a proposal. The Council also emphasises the importance of providing fiscal incentives for fuel efficiency and less polluting vehicles in order to contribute to delivering the Council's medium term objective to reach an average CO₂ emissions value for newly registered cars in the European Union corresponding to 120 grammes of carbon dioxide per kilometre by 2005 and in no case beyond 2010. The Council also reaffirms the importance of reducing CO₂ emissions from freight transport by road. In this context, the Council notes the importance of the evaluation of Directive 92/6 on traffic safety scheduled for the end of 1998, particularly in terms of addressing speed limitation of heavy commercial vehicles.
- ii) The Council recalls its Resolution of 9 June 1997, which asked the Commission to report on the taxation of aircraft fuel by the end of 1997. It urges the Commission rapidly to complete this study, keeping Member States informed on progress, in order to ensure that this work can contribute in a timely way to the ongoing discussions in ICAO. In this context, the Council also recalls its conclusions of 23 March 1998 urging Annex 1 Parties to pursue work through ICAO to limit or reduce greenhouse gas emissions.
- iii) The Council notes the contribution that maintenance of fossil fuel subsidies can make to the production of greenhouse gases, and invites the Commission to make proposals for common action progressively to reduce/remove fossil fuel and other subsidies, tax schemes and regulations which counteract an efficient use of energy.

- iv) The Council emphasises the importance of actively promoting energy efficiency. In this context, it invites the Commission to consider introducing proposals for differentiation in (...)tax levels for energy saving products, so as to allow Member States to provide appropriate economic incentives for such products, without prejudice to the principle of fiscal harmonisation.
- v) The Council recognises that improved technical performance and design of appliances and equipment can significantly reduce emissions. A programme of complementary common and co-ordinated measures, such as improved and dynamic energy efficiency product standards, certification, labelling and environmental agreements at Community level, is necessary. The Council invites the Commission to prepare a prioritised action plan, building on the measures already in place for domestic appliances, which would allow for review and improvement.
- vi) Significant emission reductions could be achieved through more widespread adoption of current energy efficiency best practice, in particular taking into account the application of Best Available Techniques as provided for under the IPPC Directive. The Council invites the Commission to develop a European programme for promoting the uptake of new, cost-effective technologies and techniques, in the context, inter alia, of the Energy Framework Programme.
- vii) The Council notes that different waste management options have different impacts on greenhouse gas emissions, and calls on the Commission to ensure that proposals for legislation on waste take into account the latest research and best available technology for minimising greenhouse gas emissions. In particular, it asks the Commission to consider the consequences for greenhouse gas emission levels in the work it has in hand on preventing and reducing methane emissions from landfill sites, notably in detailed rules under the landfill directive. It also asks the Commission to consider technical evidence on greenhouse gas emissions from other waste management options, proposing where appropriate changes to the Community waste management strategy.
- viii) The Council recalls its conclusions of 19 June 1997 inviting the Commission, in consultation with Member States, to elaborate a plan of action for preventing and reducing methane emissions. It asks the Commission to pursue this.
- ix) The Council points to the emissions of N₂O, in particular from catalysts in motor vehicles and calls on the Commission to consider possible solutions, taking into account the impact on emissions of other gases.
- x) The Council asks the Commission to ensure that research and technological development activities under the Fifth Framework Programme maximise their contribution to meeting climate change objectives by bringing forward and demonstrating new technologies and techniques, notably regarding renewable energies, for reducing emissions of all greenhouse gases, and their dissemination to third countries.

11. The Council recalls its conclusions of 18 June 1997 on the need to identify national level policies which could best be taken forward as coordinated measures by Member States, promoted by relevant Council action. It reaffirms the importance of co-ordinated action and agrees to take action in the following areas to complement common and national action.

- i) Liberalisation will have a significant impact on the shape of electricity and gas markets. The Council agrees that steps need to be taken at the national level and where appropriate at the Community level in order to ensure that liberalized markets operate in a manner which promotes environmental objectives while at the same time promoting competitiveness and consumers interests. It invites the Commission to report on any further measures needed at Community level to ensure effective operation of the market in a manner consistent with environmental objectives and in particular to consider the need for proposals to remove obstacles to the greater use of renewables.
- ii) The Council recognises the importance of low and no carbon energy sources and technologies, such as renewables and CHP. It recalls its Resolution of 11 May 1998 which agreed to promote a substantially increased use of renewables in the EU through co-operation and co-ordination of policy. The Council calls upon Member States to continue to develop national strategies and structures to achieve this end. The Council also recalls that the White Paper on renewable energy recognised the significant potential for generation from, inter alia, biomass and wind and solar energy. It asks the Commission to indicate how the Common Agricultural Policy could best be used to promote the production of renewables on agricultural land. It also recognises that Member States may wish to use state aids to encourage energy crops, and asks the Commission to consider appropriate modifications to the guidelines in favour of renewables as outlined in its White Paper.
- iii) The Council recalls its Resolution of 8 December 1997 which emphasised the scope for increasing penetration of CHP in Member States and identified measures which could promote its use. It agrees that Member States should build on these principles to stimulate the market for CHP and remove barriers to this market in order to facilitate a significant increase in the use of CHP within the Community.
- iv) The Council recalls its Resolution of 7 October 1997 on environmental agreements and recognises that environmental agreements with certain sectors can be a cost effective way of reducing greenhouse gas emissions and should be promoted where appropriate.
- v) The Council agrees that Member States should introduce transport policies which seek to influence travel demand towards less environmentally damaging forms of transport and to manage overall transport demand, taking into account environmental constraints on transport volume.
- vi) Energy use in buildings is a major source of carbon dioxide emissions in the Community. The Council recognises that standards for energy efficiency in new and refurbished buildings must be appropriate for national circumstances, but agrees that Member States will undertake an early review of their national standards to identify areas where stricter standards might cost-effectively be applied.

12. The Council notes with concern the projected growth of some industrial gases with high global warming potential. In particular, it recognises the importance of further work on policies to limit and/or reduce emissions of HFCs, PFCs, and SF₆, particularly in the light of their inclusion within the Kyoto basket of gases. It stresses the role that common and co-ordinated policies could play alongside national measures in this area and invites the Commission to develop a framework covering all fields of production and use of these gases for emission limitation and/or reduction that can be further elaborated by Member States. This framework could include the following issues: improved monitoring of actual emissions, good housekeeping, action to reduce leakage, life-cycle management and recycling, reduction of used amounts by improving efficiency of cooling/heating/air-conditioning equipment, and substitution. The Council calls upon the Member States to put in place programmes to limit and/or reduce emissions of these gases, taking into account their global warming potential including where appropriate, agreements with manufacturers and key users. In addition, the Council calls upon the Commission to pursue the development of environmentally sound and safe alternatives for HFCs, PFCs and SF₆.
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APPENDIX I

MEMBER STATES	COMMITMENTS IN ACCORDANCE WITH ARTICLE 4 OF THE KYOTO PROTOCOL	PREVIOUS ³⁹ as ALLOCATION
BELGIUM	- 7.5%	-10%
DENMARK	-21%	-25%
GERMANY	-21%	-25%
GREECE	+ 25%	+30%
SPAIN	+15%	+17%
FRANCE	0%	0%
IRELAND	+13%	+15%
ITALY	- 6.5%	-7%
LUXEMBOURG	-28%	-30%
NETHERLANDS	- 6%	-10%
AUSTRIA	-13%	-25%
PORTUGAL	+27%	+40%
FINLAND	0%	0%
SWEDEN	+ 4%	+5%
UNITED KINGDOM	-12.5%	-10%

EN

- 7 -

TOTAL P.08

TOTAL P.08

A Preliminary Evaluation of the EU Trading Restriction Proposal and Bubble Allocation

In May, the EU proposed restrictions on international emissions trading, JI, and CDM that limit Annex I countries' opportunities to buy and sell emissions. The buying restrictions took the form of two formulas, where a country could choose the less binding of the formulas. If a country could demonstrate to a review team that domestic abatement measures produced emissions reductions in excess of the binding level, then the buying cap could be raised such that purchased allowances equaled verified domestic abatement. The selling restriction also took the form of a formula, with the opportunity to raise the binding selling cap equal to the amount of verified domestic emissions abatement.

In 1998, the EU announced its "Bubble Allocation" under Article 4 of the Kyoto Protocol. Under the bubble allocation, EU members transfer portions of their emissions assigned amounts to other EU countries. While all EU countries have Annex B targets of 1990 -8%, under the bubble allocation these adjusted targets range from 1990 -28% to 1990 +27%.

Based on EU data for the Annex B base years and for BAU projections through 2010, we conducted a preliminary evaluation of the Article 4 bubble allocation in light of the restrictions proposed by the EU.¹ By applying the buying and selling constraint formulas to the EU bubble allocation, we found that 10 of the 15 EU countries would violate the EU proposal to restrict flexibility: six EU countries would receive transfers in excess of their binding buying constraints, and four EU countries would transfer emissions in excess of their selling constraints.

Country	Acquired Transfers under Bubble Allocation as a Share of Binding Buying Constraint	Country	Transfers to Other Countries under Bubble Allocation as a Share of Binding Selling Constraint
Greece	468%	Luxembourg	417%
Portugal	364%	Germany	271%
France	167%	Denmark	271%
Spain	192%	Austria	104%
Ireland	147%		
Sweden	136%		

¹ The EU made these data available when it announced its proposal to restrict the flexibility mechanisms in May.

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Spain	192%	Austria	104%
Ireland	147%		
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* EU bubble allocation would give these countries hot air targets.

While the selling restriction was ostensibly designed to limit Russian sales of hot air, three of the four countries violating the selling restriction do so by transferring their own hot air.³ *Indeed, three-quarters of all transferred tons in the EU bubble allocation are hot air tons.* Germany's transfer is 94% hot air, even though the EU formula restricting sales would never let the

¹ For example, the binding buying constraint for the U.S. is equal to 38% of the emissions reductions necessary for it to achieve its Annex B target. If the U.S. could prove to a review team that it had reduced emissions through domestic abatement measures equal to 50% of its required reductions, then its buying constraint would increase from a level equal to 38% to a level equal to 50% of the required reductions to achieve the target.

² The EU made these data available when it announced its proposal to restrict the flexibility mechanisms.

³ For purposes of this analysis, we have assumed that a country has hot air if its Annex B target is more than its 2010 BAU according to the EU data.

Germans transfer more than 39% of its hot air through the other flexibility mechanisms. All of Luxembourg's transfer is hot air, and more than half of Denmark's transfer is hot air.

While the EU proposal does allow for countries to raise their buying and selling caps by demonstrating domestic abatement, the transfers under the EU bubble can not be based on demonstrated domestic abatement, since the EU calls for this process to be developed under Article 8 of the Kyoto Protocol. In the cases of France and Portugal, where the bubble transfers indicate that no domestic abatement would be necessary to comply with their adjusted targets, no Article 8 review would justify such acquisitions under the EU flexibility restrictions proposal. Moreover, by restricting hot air, Germany would be very unlikely to sell as many tons in the flexibility mechanisms under the EU proposal as it has transferred under the EU bubble allocation.⁴

We should emphasize that this analysis is based on EU emissions projections through 2010. These projections tend to be lower than independent forecasts for the EU. Higher forecast emissions growth, especially between 1994 and 2002 under one of the buying restriction formulas, would relax the buying constraints. Further, higher forecast emissions would decrease estimates of hot air transfers as well as potentially reduce the number of countries with hot air targets under the bubble allocation.

⁴ Note: Germany could sell emissions allowances in excess of the bubble allocation hot air transfer through the Kyoto flexibility mechanisms if it reduces emissions to 34% below its 1990 level, beating its bubble allocation target by 13% and demonstrating to the review team that the reduction of 13% below its target represents domestic abatement. The emissions represented by this 13% would equal the hot air transfer. We consider the probability that Germany would reduce emissions to that level through explicit abatement policies to be low.

A Preliminary Analysis of the EU Proposals on the Kyoto Mechanisms

prepared by **Richard Baron, Martina Bosi, A' Pershing**
Energy and Environment Division, Inte

28 May 1999

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

of pages 11

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June 8, 1999

I. Introduction

1. On May 17, 1999, the European Union Council of Ministers agreed on a Community strategy for climate change. This strategy included recommendations on definitions for supplementarity; specifically, it proposed limits on the share of emissions reductions a country might obtain through use of the Kyoto Protocol's flexibility mechanisms. Given the significant interest both in the overall issue of the Kyoto mechanisms, and in proposals on this issue by Parties, the IEA has undertaken a preliminary analysis of the implications of this proposal.
2. The EU proposal is divided into two sections – rules for "buyers" and rules for "sellers". In the buyer case, two options are provided, and Annex B Parties' purchases may not exceed the higher of the two:

(1) 5% of (base year emissions multiplied by 5) + (assigned amount)

2

or

(2) 50% of the difference between the actual annual emissions of any year between 1994 and 2002 multiplied by 5, and its assigned amount.

3. A simple example may serve to illustrate the operation of this rule. Under alternative (1), if a country's base year emissions were 100 tons, and it was required to undertake a 5% reduction below the base year level in the commitment period (i.e. the assigned amount is 475 tons in this case), it could purchase 24.375 tons ($0.05 * ((500+475)/2)$). Assuming national emissions rise between the base year and 2004 by 10 percent, under alternative (2), the same country could purchase 37.5 tons ($0.5 * (110*5-475)$). If emissions, absent domestic actions, were to rise by 10% over the commitment period, under case 1, the country could purchase only approximately 32% of its "gap." Under case 2, it could purchase 50% of its gap.
4. However, the EU proposal includes a provision that would allow an Annex B Party to purchase more emissions than the amount defined by the ceiling. This would only be possible in the case of an Annex B Party achieving emission reductions, through verifiable (according to the still to be defined rules under Article 8) domestic policies and measures undertaken after 1993, greater than the amount allowed under the ceiling. The additional amount that could be purchased would be limited to the difference between the amount of reduction achieved domestically minus the total amount allowed to purchase under the formulas. For example, a Party that has a ceiling (under the formulas) of 25 tons and implements domestic policies and measures resulting in a reduction of 40 tons, it would be allowed to increase its purchasing ceiling by 15 tons (40-25). That Party would thus be allowed to purchase a total of 40 tons (25+15).

5. A separate rule is also applied to limit the tons that may be sold by an Annex B Party. Under this constraint, a selling party may not transfer more than the amount allowed by the following formula:

$$5\% \text{ of } \frac{(\text{base year emissions multiplied by } 5) + (\text{assigned amount})}{2}$$

6. An example may also serve to illustrate this constraint: Assume a country with base year emissions of 100 tons had an assigned amount of 500 tons (i.e. stabilization of base year emissions during the five-year commitment period). If that country was expected to have emissions of only 80 tons per year in the commitment period, such a country could nonetheless only transfer 25 tons of its expected 100-ton potential ($500 - (80 \times 5)$). It should be noted that in the case of a selling Annex B country, limits on transfers are applied only to the initial assigned amounts, and these may be augmented by domestic action undertaken if they meet agreed (still undefined) rules under Article 8 of the Protocol.
7. This paper applies these formulas to each of the Annex B Parties; the results are listed in table 1, and described more fully below. Implications are discussed in Section II. Data on base year emissions, and on projected emissions are those provided to the IEA and published in the *"Energy Policies of IEA Countries – 1998 Review"*, and *"CO2 Emissions from Fuel Combustion – 1998 Edition"*. Section III of this paper provides some additional assessment of the price implications from such constraints.
8. A number of shortcomings in this analysis must be recognized at the outset:
- o IEA data (and therefore this analysis) is limited to emissions of CO2 from the energy sector; as this proposal would ultimately apply to all greenhouse gases, and sinks, the evaluation can only serve as an approximation of the true costs or emissions consequences.
 - o There is a wide array of models available to project both emissions reduction costs and the number of tons of greenhouse gases that would be purchased by Parties; this evaluation uses estimates as described in recent results from the World Energy Outlook and the OECD GREEN model. Clearly, a more robust analysis would require detailed information on national cost curves for both selling and buying Parties (including Parties not included in Annex B).
 - o This analysis makes the assumption that all exchanges (through Article 6, 12 or 17) have no associated transaction costs; this assumption is most likely to affect the price of CDM units, but may influence the overall amount traded and the total price of permits.
 - o This analysis does not include estimates of the impact of domestic policies and measures and may thus underestimate the total quantity of emission units that can be purchased by Annex B Parties.

II. Preliminary quantitative assessment of the EU concrete ceilings

9. The proposal sets clear rules on how to determine amounts that would be available for sale, and amounts that could be acquired. Based on the IEA energy-related CO2 emissions, which represent the majority of GHG emissions for most Annex I Parties, we have attempted to quantify the implications of the ceiling on the market.

Effects on Buyers

10. Table 1 gives an idea of the total demand that would be allowed by the rules. We assume that Parties would wish to use the highest of the two numbers (5% of the average of 1990 and

assigned amount, or 50% of the difference between the highest emission years between 1994-2002, and the assigned amount). In order to find the highest year between 1994-2002, we used IEA country projections on energy use expanding to 2000 or 2010. Based on these data, we find that the rule would allow buyers to acquire a total of 1,091 Million tons of CO₁. This number amounts to one third (36%) of the total gap between expected 2010 emission levels under business as usual and the Kyoto Protocol target (3,005 million tons of CO₂) – See table 2.

11. For most Annex II countries (potential buyers), the "50%" rule allows for a higher quantity of acquisitions, except for those countries where current emissions are close to their annual assigned amount (France, Portugal, for instance). For some countries, the EU rules would allow purchases of a significant amount of emission units, expressed as the percentage of the gap that can be acquired through trading: Denmark (479%), Luxembourg (854%), and Switzerland (721%). There are two explanations for these high figures:
 - o Denmark has experienced very high emissions in 1996; 50% of the difference between such a high year and its assigned amount is therefore relatively large;
 - o Projections submitted to the IEA by Luxembourg and Switzerland for 2010 are very close to their assigned amount: their 'gap' between business-as-usual 2010 emissions and their annual assigned amount is very small. As a result, the allowed quantity, under either rule, appears relatively big. Clearly, an analysis such as this is very much dependent on the quality of projections submitted by Member countries to the IEA: small changes in numbers may have significant effects.

Effects on Sellers

12. It is difficult to estimate how much would be available for sale in Annex B Parties without any additional mitigation efforts. In Table 3, we give an indication of how much "surplus" is available *today* in countries with economies in transition. These countries' energy-related CO₂ emissions remained lower than their assigned amount (on an annual basis) in 1996, by a total of 1,127 million tons of CO₂. The IEA World Energy Outlook projects that under business-as-usual conditions, 2010 emissions from countries in Central and Eastern Europe, the Russian Federation and Ukraine would be lower than their 1990 level by about 574 million tons of CO₂.
13. A unique formula is given for the ceiling applied to sellers: 5% of the average between the assigned amount and the base year emissions. The total supply, based on this rule, would be limited to 190 million tons of CO₂. With this ceiling, these countries would only be able to sell one third of their available reductions in 2010: 190 million tons out of 574.
14. According to the proposal, Annex B Parties would need to demonstrate that they have undertaken specific abatement measures, and quantify their impacts in order to be able to sell any tons over the ceiling. This would add transaction costs to these tradable emission units, which would reduce the efficiency of the international trading system. The OECD GREEN model projects that Ukraine and Russia would sell 971 million tons of CO₂, that is some 400 million tons additional to their 'no-cost' potential. Before they could sell this amount, they would need to ensure that it is "verifiable" under the rules to be developed under Article 8.
15. Because demand would be limited to 1,091 million tons of CO₂ and "supply" to 190 million tons, an excess demand of 901 million tons of CO₂ could be created. This excess demand could be met by CDM projects, or policies and measures undertaken by sellers after 1993. Joint Implementation projects undertaken after 1993 would seem to fit in that category. However, the ceiling on sellers is expressed "for all three mechanisms", including JI. This issue would need clarification. By creating a restriction on how much Annex I Parties can sell, the restriction on sellers could create higher demand for CDM and possibly JI projects (see following section).

III. Preliminary Analysis of the effects of the proposal on price

16. For the purpose of this analysis, it is assumed that emission units resulting from international emissions trading (Art. 17), joint implementation (Art. 6), and the Clean Development Mechanism (Art. 12) are all fungible for the purpose of meeting the Kyoto emissions targets.
17. In effect, the Council's proposal puts restrictions on the total amount of emission units that can be *bought*. However, the Council's proposal does not put a restrictions on the total amount of emission units that can be *sold*, as it only puts a restriction on the amount of emission units that can be sold by *Annex B* Parties.
18. In theory, these restrictions would lead to a reduction of the potential gains of an unrestricted market of emission units (including international emissions trading, JI and CDM): instead of acquiring cheaper emission units from the market, Annex B Parties would incur higher mitigation costs at home. Potential sellers are thus less encouraged to undertake mitigation activities that could generate supply of emission units on the market than they would be with an unfettered market.

The Demand for International Emission Units

19. The IEA has attempted to illustrate the impact of the Council's proposal on overall Annex B demand for international emission units (see graph 1). In essence, it takes the form of a vertical cut in the demand curve for emission units limiting the total amount that can be acquired (1,091 million tons of CO₂).
20. All other things being equal, a lower demand will drive the market price down compared to the unrestricted case. The quantity of emission units produced and transferred would be reduced. All this would lead diminished revenues for the sellers (from Annex B and non Annex B) of emission units.
21. Assuming a competitive market, the effect on the acquiring Annex B parties could take 2 forms:
 - (i) Countries that are unaffected by the Council's restrictions (i.e. the quantified limit imposed on a Party is greater than the amount of emission units that it would acquire even in an unrestricted market) would benefit from a lower price for emission units; or
 - (ii) Countries that are affected by the Council's restrictions (i.e. the limit imposed is less than the amount that they would otherwise acquire in an unrestricted regime) also benefit from the lower price of international emission units, but this is combined with higher domestic cost than would otherwise be the case.
22. It is interesting to note that this reduction in price, brought about by the restriction of quantities that can be acquired could create an incentive for sellers of emission units to operate in an imperfect market, such as a cartel, in order to seek a higher price for their units. The efficiency losses for acquiring Annex B Parties would be even greater. Of course the stability of a potential cartel is reduced if there is a large number of potential sellers. It is also possible that such market imperfections could occur even absent any caps.

The Supply of International Emission Units

23. The overall efficiency gains of an unrestricted market for emission units are reduced by the EU proposal because some of the lowest cost options are no longer available. However, the Council's restriction does not apply to the overall quantity of emission units that can be

transferred. As the restriction does not apply to emission units resulting from JI or CDM projects, this restriction may encourage greater investment in JI and CDM. The Council proposal restricts only the amount of emission units that do not result from verifiable domestic action undertaken after 1993 that can be sold by Annex B Parties.

24. All other things being equal, the effect of the Council's restriction on the sale of emission units would trigger an increase in the market price (see [graph 2](#)): in order to satisfy the same level of demand, more costly units would be put on the market.

IV. Preliminary conclusions on the overall effect of the EU Council's proposed restrictions

25. The restriction in demand would normally lead to a *lower* price. However this restriction is combined with an *imperfect* restriction on supply (i.e. there is only a restriction on "hot air" and NOT on the total amount of emission units that can be sold on the international market), which alone would lead to an *increase* in price. More in-depth quantitative analysis would be required to determine the final impact on price of the combination of those two types of restrictions. Any such analysis would always hinge on the quality of the estimated GHG mitigation cost curves.
26. With respect to JI and CDM, it is unclear what will be the combined effect of the EU Council's proposed restriction on buyers and sellers. The restriction on demand reduces the overall amount of emission units purchased, including from JI and CDM. However, the restriction on supply exempts units resulting from JI and CDM projects, thereby lessening the negative impact caused by the restriction on Annex B demand.
27. The effect on the price and consequently on the loss of efficiency (for sellers and buyers) compared to an unfettered global trading scheme will depend on various factors, in particular:
- 1) The quantity of emission units available from CDM projects;
 - 2) The availability of low cost domestic abatement opportunities within countries;
 - 3) The magnitude of the CDM fee (most models estimate CDM as being without transaction costs and being similar to IET, but this is rather unlikely to be the case in practice);
 - 4) Whether the sellers want to collude and artificially restrict supply in order to obtain a higher price for the emission units, thereby taking advantage of the restriction on demand.
28. There is nonetheless a clear loss of overall efficiency due to the fact that some Annex B Parties will spend more economic resources on domestic abatement than would be the case if they could acquire units from an unrestricted market. Economies in transition having emission units to sell at no marginal cost will see part of their potential revenue benefit reduced. It is also possible that developing countries will have reduced CDM revenues as a result of the restriction on overall demand.

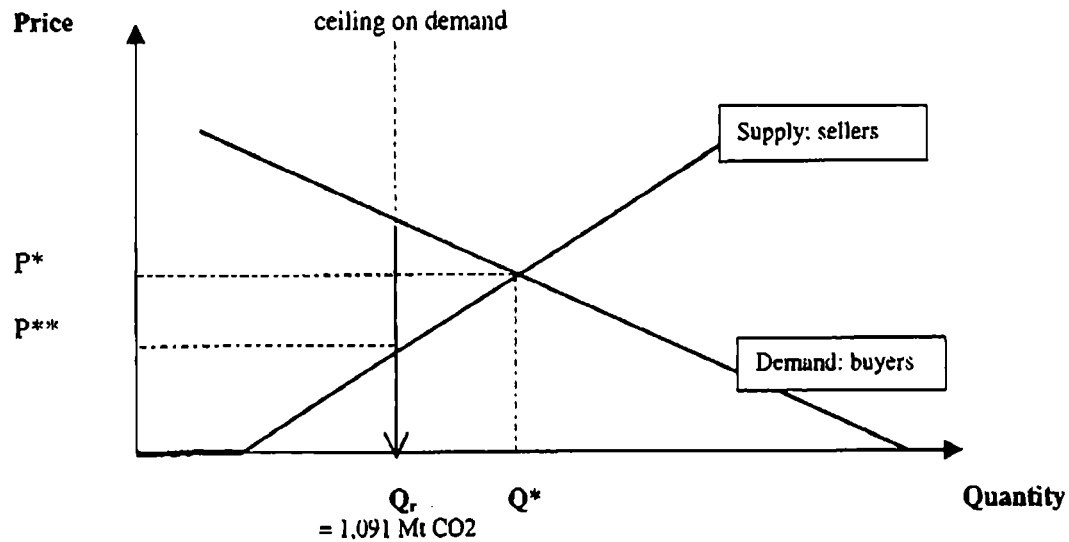
Tables and Graphs : [click to view](#):

- [Graph 1: Ceiling on demand only: an illustration](#)
- [Graph 2: Ceiling on supply only: an illustration](#)
- [Table 1 : Impact of EU concrete ceiling on trading - Illustration based on energy related CO2 emissions](#)

- Table 2 : Tradeable units for potential buyers (Annex II countries)
- Table 3 : Energy-related Co2 emissions and assigned amount for countries in transition

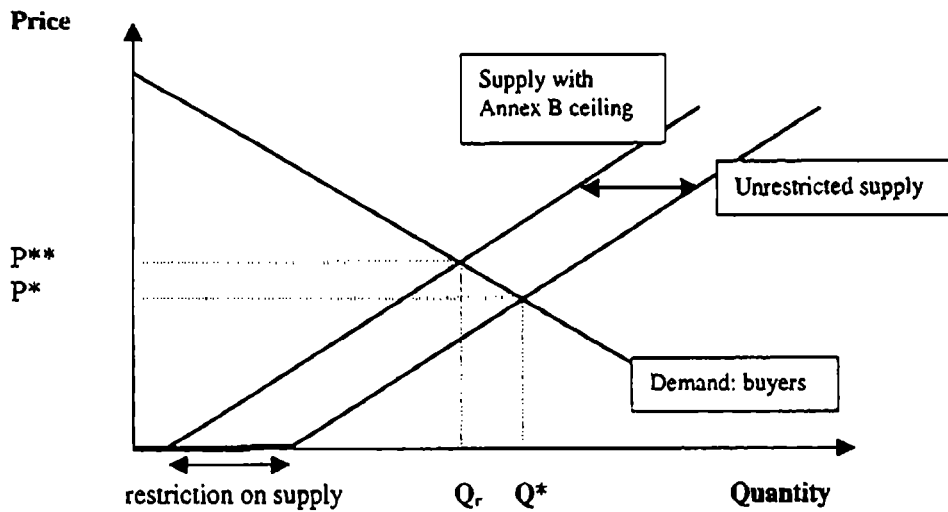
For further information, please contact Jonathan Pershing (tel. 331-4057-6720; e-mail jonathan.pershing@iea.org) or Richard Baron (tel. 331-4057-6724; e-mail richard.baron@iea.org)

Graph 1: Ceiling on demand only: an illustration



The ceiling on demand for international units represents a vertical break in the demand curve. Instead of buying Q^* on the unrestricted market, buyers can only acquire Q_r . Under perfect competition on the sellers' side, P^{**} , the new price after the restriction on demand is applied, is lower than P^* , the price of emission units without the restriction.

Graph 2: Ceiling on supply only: an illustration



The ceiling on how much *Annex B Parties* can sell results in a shift of the supply curve to the left. *Annex B Parties*, with already available reductions, would essentially supply reductions at 'no cost', on the bottom left part of the curve. In this case, P^{**} , the new price after the restriction on supply, is higher than without the restriction.

Table 1
Impact of EU Concrete Ceiling on Trading - Illustration based on energy-related CO₂ emissions

	Base year emissions Mt CO ₂	Assigned Amount (%)	Highest emissions 1994-2002 Mt CO ₂	2010 emissions minus annual AA for buyers	"5% rule" sellers in (...) Mt CO ₂	"50% of difference" (buyers only)	Maximum of two rules Mt CO ₂
Australia	262.98	108	334.99	103	13.68	25.48	25.48
Austria	59.36	87	84.80	14	2.78	6.58	6.58
Belgium	109.11	92.5	124.57	20	5.25	11.82	11.82
Bulgaria	73.48	92	-	-	(3.81)	-	-
Canada	427.53	94	504.45	149	20.74	51.29	51.29
Croatia	16.61	95	-	-	(0.81)	-	-
Czech Republic	141.83	92	-	-	(6.81)	-	-
Denmark	52.93	79	72.32	3	2.97	15.25	15.25
Estonia	25.50	92	-	-	(1.22)	-	-
Finland	54.36	100	66.31	16	2.72	5.98	5.98
France	378.31	100	384.85	29	18.92	3.17	18.92
Germany	981.42	79	909.14	120	43.92	66.91	66.91
Greece	72.28	125	88.30	45	4.07	3.97	4.07
Hungary	77	94	-	-	(3.52)	-	-
Iceland	2.22	110	-	-	0.12	n.a.	0.12
Ireland	33.24	113	40.26	7	1.77	1.35	1.77
Italy	408.15	93.5	446.71	103	18.74	32.55	32.55
Japan	1,061.77	94	1,177.69	140	51.50	89.81	89.81
Latvia	15.63	92	-	-	(0.75)	-	-
Liechtenstein	-	92	-	-	-	-	-
Lithuania	21.44	92	-	-	(1.03)	-	-
Luxembourg	10.86	72	10.96	0	0.47	1.57	1.57
Monaco	-	92	-	-	-	-	-
Netherlands	161.27	94	168.72	44	7.62	18.56	18.56
New Zealand	25.35	100	34.92	13	1.27	4.79	4.79
Norway	29.76	101	34.34	-	1.50	2.14	2.14
Poland	449.06	94	-	-	(19.28)	-	-
Portugal	41.47	127	56.97	13	2.35	2.15	2.35
Romania	185.48	92	-	-	(8.64)	-	-
Russian Federation	2,181	100	-	-	(109.04)	-	-
Slovakia	54.17	92	-	-	(2.60)	-	-
Slovenia	12.74	92	-	-	0.61	-	0.61
Spain	215.02	115	284.83	-	11.56	18.78	18.78
Sweden	52.85	104	59.30	7	2.69	2.27	2.69
Switzerland	44.24	92	44.75	0	2.12	2.02	2.12
Ukraine	666	100	-	-	(33.28)	-	-
United Kingdom	585.29	87.5	578.98	108	27.44	33.42	33.42
United States	4,873.42	93	5,880.71	2,070	235.14	674.22	674.22
Total	13,872.58				288.73		1,091.78
Demand from Annex II Countries				3003*	480.51		
Supply from Countries in transition				574**	(190.78)		
Excess demand (demand - supply)							901.00

Base year emissions come from the IEA CO₂ emissions from fuel combustion (1971-1996), with appropriate changes in base years for Bulgaria (1988), Hungary (1985-1987), Poland (1988), and Romania (1989)

Highest emission levels are based on countries energy projections (Energy Policies of IEA Countries, 1998, IEA), applying growth rates to 2010 to the 1997-2002 period.

All countries in transition except Slovenia are assumed to be sellers, all other Annex I Parties are assumed to be buyers

For Russian Federation and Ukraine, 1990 emission levels were derived from 1992 emission levels and 1990-1992 emission statistics for the Former Soviet Union

* The sum of the gap between projected energy-related CO₂ emissions of Annex II Countries and their assigned amount (annual)

** This figure comes from the IEA World Energy Outlook, 1998 Edition and represents the gap between 1990 and 2010 levels

Table 2
Tradeable units for potential buyers (Annex II countries)

	2010 - annual assigned amount "gap" (in MtCO ₂)	Maximum acquisitions (in Mt CO ₂)	Share of gap that can be acquired w. 3 mechanisms
Australia	103	25	25%
Austria	14	7	46%
Belgium	20	12	59%
Canada	149	51	34%
Denmark	3	15	479%
Finland	16	6	38%
France	29	19	66%
Germany	120	67	56%
Greece	45	4	9%
Iceland	-	0.12	n.a.
Ireland	7	2	24%
Italy	103	33	31%
Japan	140	90	64%
Luxembourg	0	2	854%
Netherlands	44	19	42%
New Zealand	13	5	38%
Norway	-	2	n.a.
Portugal	13	2	18%
Spain	-	19	n.a.
Sweden	7	3	37%
Switzerland	0	2	721%
United Kingdom	108	33	31%
United States	2,070	674	33%
Total	3,005	1,091	36%

Table 3**Energy-related CO2 emissions and assigned amount for countries in transition**

	"Annual" Assigned Amount (Mt CO2)	Emissions in 1996 (Mt CO2)	Gap observed in 1996 (Mt CO2)	Maximum tradeable amount (Mt CO2)
Bulgaria	79	55	(24)	(3.81)
Croatia	16	15	(1)	(0.81)
Czech Republic	130	122	(8)	(6.81)
Estonia	23	20	(4)	(1.22)
Hungary	73	60	(12)	(3.52)
Latvia	14	9	(5)	(0.75)
Lithuania	20	15	(5)	(1.03)
Poland	422	365	(57)	(19.28)
Romania	178	123	(55)	(8.64)
Russian Federation	2,181	1,517	(664)	(109.04)
Slovakia	50	39	(10)	(2.60)
Ukraine	666	388	(278)	(33.28)
Total	3,852	2,728	(1,124)	(191)

Evaluation of EU Trading Constraint Proposal

The European Union has proposed quantitative restrictions on both Annex B buyers and sellers of emissions allowances in international emissions trading, joint implementation, and the Clean Development Mechanism. We analyze the effects of the restriction on Annex B trading and joint implementation. This proposal would significantly increase the costs of compliance without providing any additional climate benefits. For the United States, permit prices would double to quadruple. Moreover, this proposal would create a complicated emissions trading bureaucracy that would likely raise costs further.

Our analysis illustrates three key points:

- The EU claims that so-called “qualitative” language provides significant additional flexibility. This analysis shows that this language does not do this.
- Restrictions on sellers prove more onerous than restrictions on buyers. Even if restrictions on buyers were relaxed, there would be little economic impact on buying countries’ compliance costs.
- If trading rules required sellers to choose between selling “hot air” and “real verified reductions”, costs for all buying countries would remain high.

Below we discuss the following:

I. Description of Trading Constraints¹

II. Annex I Costs with Trading Constraints

III. Transaction Costs with Trading Constraints

IV. No Additional Climate Benefits with Trading Constraints

¹ While we use the term “trading constraint” throughout this paper, we imply a constraint on international emissions trading, joint implementation, and the Clean Development Mechanism.

I. Description of Trading Constraints

Purchase Constraint

The EU proposal provides a formula for net purchases, where the constraint is the higher of:

- 1) 5% of the average of base year emissions and emissions target², or
 - 2) 50% of the difference between highest year's emissions during 1994-2002 period and emissions target.
- Preliminary analysis for the United States indicates that option 1 would allow us to purchase 13% of the reductions necessary to comply with our target. Option 2 would allow us to purchase close to 40%. Some may be concerned that the second option would create the perverse incentive to increase emissions through 2002 or delay early action to increase the level of the ceiling.
 - In addition to the formula, the text provides that the ceiling on purchases can increase subject to an evaluation of domestic abatement efforts. If an expert review team can *verify* total domestic reductions in excess of the purchase ceiling, then the ceiling would be adjusted up to the level of domestic abatement. For the United States the ceiling is "flexible" within a range, but hard at 50%. For some countries, however, the ceiling could be greater than 50%.
 - Evaluating ceilings as a function of emissions reductions is very sensitive to emissions forecasts. The EU's forecasts for its member countries reflect much slower emissions growth than most independent assessments. These forecasts could affect estimates of demand in the international emissions markets, and subsequent permit prices. For example, the EU estimates that its emissions of all 6 greenhouse gases will be 6% above its Kyoto target in 2010 under business as usual, while projections by the Energy Information Administration and the International Energy Agency would imply business as usual carbon dioxide emissions 19 to 26% above the EU target in 2010.

Selling Constraint

The EU proposal provides a constraint on net sales set equal to:

5% of the average of base year emissions and emissions target.

² All constraints are normalized to a common period of time.

- Most economic analyses find that only former Soviet bloc countries will likely be net sellers during the first commitment period (without developing country participation). This constraint would allow the Former Soviet Union to sell only approximately 20% of its so-called hot air. This formula alone would also provide no incentive for domestic abatement.
- However, like the purchase constraint, a country can raise its ceiling up to the level of its *verified* domestic abatement. In this case, if a country wanted to sell allowances in excess of its ceiling as specified by this formula, it would not be able to sell any of its so-called hot air. Every sale would have to be backed by a verified reduction.

II. Annex I Costs with Trading Constraints

Some preliminary analysis of the trading proposals indicates that the costs of all Annex I countries could increase significantly. For the United States, permit prices would double to quadruple, depending on the ability of former Soviet bloc countries to prove and verify actual reductions. Since it is unclear how the trading constraint formulas could apply to as yet unspecified non-Annex I country targets, we have focused these illustrations on Annex I trading only. In addition, given the difficulties in modeling a project-based approach, we have not incorporated the CDM in these analyses. We provide below three scenarios that vary based on the extent that countries can raise their purchase and selling ceilings through "verified emissions reductions."

- *Scenario 1:* Assuming that neither buyers nor sellers can meet the burden of proof established for increasing their ceilings above the formulas provided in the EU proposal, *all buying countries see their resource costs increase by 80 to 170%.*

Scenario 1: Annex I Trading, with and without EU Proposal

Country	Permit Price, Unconstrained	Resource Cost, Unconstrained	Permit Price, Constrained	Resource Cost, Constrained
United States	\$51/ton	\$22.7 billion	\$174/ton	\$41.3 billion
Japan	\$51/ton	\$5.1 billion	\$227/ton	\$14.0 billion
Canada	\$51/ton	\$2.7 billion	\$208/ton	\$7.2 billion
EU	\$51/ton	\$11.6 billion	\$174/ton	\$23.9 billion
Australia	\$51/ton	\$0.7 billion	\$154/ton	\$0.8 billion

International Emissions Permit Price with EU Proposal: \$174/ton

In addition to the much higher resource costs for buying countries, selling countries (Former Soviet Union and Eastern European countries) would see their transfers fall by 35 to 55%. The international price for an emissions permit would be so high that Australia would find it economic to become a net seller.

The high international permit price makes it economic for both the United States and the EU to undertake a vast majority of their emissions reductions at home. The United States only purchases 2% of its reductions abroad, while the EU only purchases 10% of its reductions abroad.

- *Scenario 2: Assuming that the buying countries can adjust their purchase ceilings to reflect all their real reductions, but that selling countries cannot meet the burden of proof established for increasing their selling ceilings (the 5% formula on sales is binding), the international permit price would be almost equivalent to the U.S. permit price under no trading.*

Scenario 2: Annex I Trading, with and without EU Proposal

Country	Permit Price, Unconstrained	Resource Cost, Unconstrained	Permit Price, Constrained	Resource Cost, Constrained
United States	\$51/ton	\$22.7 billion	\$178/ton	\$41.3 billion
Japan	\$51/ton	\$5.1 billion	\$178/ton	\$13.8 billion
Canada	\$51/ton	\$2.7 billion	\$178/ton	\$7.2 billion
EU	\$51/ton	\$11.6 billion	\$178/ton	\$24.0 billion
Australia	\$51/ton	\$0.7 billion	\$178/ton	\$0.7 billion

International Emissions Permit Price with EU Proposal: \$178/ton

Note that in this case, the selling constraint is so stringent, that the United States effectively does not participate in international trading (the United States is estimated to purchase 1.5 MMTCE per year, on net, in this scenario).

Like scenario 1, some of Australia's resource costs are offset because the permit price is high enough for it to switch from being a net buyer to a net seller.

Since buyers can increase their buying constraint through "verified emissions reductions", Japan and Canada are not constrained like they were in scenario 1. (In scenario 1, the buying constraint prevented these countries from bidding on lower priced emissions permits, so their domestic permit price was higher than the international emissions permit price.) Their additional demand for international emissions permits increases the

international emissions permit price from \$174/ton in scenario 1 to \$178/ton in this scenario.

- *Scenario 3:* Assuming that the buying countries can adjust their purchase ceilings to reflect all their real reductions, and that selling countries can do so as well, i.e., selling countries cannot sell any hot air and all reductions can be verified, the international permit price would be more than \$100/ton, and more than double the unconstrained price.

Scenario 3: Annex I Trading, with and without EU Proposal

Country	Permit Price, Unconstrained	Resource Cost, Unconstrained	Permit Price, Constrained	Resource Cost, Constrained
United States	\$51/ton	\$22.7 billion	\$106/ton	\$35.7 billion
Japan	\$51/ton	\$5.1 billion	\$152/ton	\$9.9 billion
Canada	\$51/ton	\$2.7 billion	\$137/ton	\$5.1 billion
EU	\$51/ton	\$11.6 billion	\$106/ton	\$19.5 billion
Australia	\$51/ton	\$0.7 billion	\$106/ton	\$1.0 billion

International Emissions Permit Price with EU Proposal: \$106/ton

III. Transaction Costs with Trading Constraints

Difficulty in Identifying Real Reductions

The EU proposal provides an opportunity to revise upward ceilings (to a limit) based on an evaluation of domestic action taken to reduce emissions through an expert review process. While some may argue that this could make the proposed constraints less stringent, our analysis shows that the costs would still be considerably higher than in an unconstrained system. However, it would be very difficult to operationalize such a procedure.

- Evaluating whether a specific reduction, or set of reductions, resulted from direct domestic actions (as opposed to simply an economic downturn), requires knowing the counterfactual. However, business as usual can never be known with certainty, so estimating “domestic effort” with sufficient precision to adjust a trading constraint could be very problematic.
- The process of attempting to identify and verify emissions reductions from domestic activities can be costly, especially for fiscally-constrained countries, like some of the potential Annex I sellers. Some are already concerned that Russia will not have a

sufficient monitoring and inventorying system for trading. Adding another layer of requirements for trading may negatively impact their participation.

- Instead of undertaking real reductions and selling both the real reductions and the so-called hot air as predicted by most economic models, this proposal requires that countries choose between selling hot air and real reductions. Contrary to its stated intent, the EU's proposal could raise the costs of undertaking real reductions enough that Russia and other countries simply sell the fraction of their hot air they are allowed to with the selling formula and then avoid any further actions.

Problems with Devolution to Private Sector

By constraining both the purchase and sale of permits, the EU proposal would complicate the interaction between domestic trading program involving private firms and international emissions markets. Just as importantly, the limit would create an allocation problem domestically, i.e., how to allocate the "right" to import or export emissions permits. If allocated by some method other than open bidding, the process could create a domestic lobby for perpetuating the limit. Firms could view their allocation as an "entitlement."

- There are a number of ways to implement a limit, but the simplest might be for the government to issue "right-to-import" or "right-to-export" certificates up to the limit through a process of open bidding. If, for example, international purchases were recorded at the national trading registry, then the buyer would have to present one right-to-import certificate along with a foreign permit for it to be officially accepted. Similarly, anyone wanting to sell a permit internationally would have to acquire one right-to-export certificate and combine it with one domestic permit in order to export.
- Arbitrage would equate the price of domestic permits to the international price of permits plus the certificate price. The price of the certificates would fluctuate on the market, depending on whether the limit is binding. Their price would be zero -- i.e., the domestic price and foreign price would be the same -- if the constraint were not binding.
- The additional administrative burden of implementing a dual permit program or some other quota allocation system would raise the costs of trading beyond those reflected in the illustrative quantitative assessment presented here.

IV. No Additional Climate Benefits with Trading Constraints

Regardless of where a greenhouse gas emission reduction occurs, it has the same effect on total greenhouse gas emissions and the same effect on the climate.

- In proposing trading constraints, the EU has focused on countries such as Russia, that will have emissions below their Kyoto targets during the commitment period because of the decline in their economic output associated with the transition to market economies. If trading constraints are established that restrict the ability of Russia to sell permits, then emissions during the first commitment period would be lower than in the absence of such constraints.
- However, Russia would simply bank its allowances and use these allowances in a subsequent commitment period when its emissions exceed its target. While a trading constraint might lower emissions during the first commitment period, the cumulative emissions over several commitment periods from Annex I countries would be the same with and without the trading constraint. Given the long residence times of greenhouse gases (on the order of a 100 or more years), the cumulative effect is what is most relevant in terms of changes in the global climate.

***** U N C L A S S I F I E D *****

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Model Results with EU numbers

(MiniSGM model run with EU assumptions on target reductions, 2010 BAU, and buying and selling caps, with the exception of Eastern Europe, for which we use SGM numbers for target reductions, 2010 BAU, and the buy cap.)

TRADING SCENARIO

Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1434	492	0	Umbrella
Japan	302	83	0	Umbrella
Canada	141	35	0	Umbrella
FSU	1054	0	59	Umbrella
W. Eur	1024	66	0	Umbrella
Austrl	118	25	0	Umbrella
E. Eur	511	0	108	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

RESULTS WITH NO TRADING OR CDM CONSTRAINTS

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	40.18	14775.71	234.54	-257.46	10344.65
Japan	40.18	2945.62	18.83	-64.17	2578.29
Canada	40.18	1149.93	12.27	-22.73	913.13
FSU	40.18	-5727.13	157.55	216.55	-8700.98
W. Eur	40.18	1069.26	76.44	10.44	-419.35
Austrl	40.18	794.06	9.98	-15.02	603.66
E. Eur	40.18	-4832.29	24.39	132.39	-5319.40
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.
EU Cap Scenario: The buying cap is the EU formula base cap only.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	199	0	199
Japan	35	0	35
Canada	13	0	13
FSU	53	0	53
W. Eur	53	0	53
Austrl	8	0	8
E. Eur	26	0	26
China	0	0	1000000000000000000
India	0	0	1000000000000000000
Korea	0	0	1000000000000000000
Mexico	0	0	1000000000000000000
ROW	0	0	1000000000000000000

EU FORMULA SELLING CAPS			
Country	EU base selling cap (MMTCE)	Real reductions above base cap (MMTCE)	Total EU selling cap (MMTCE)
US	74	343	74
Japan	16	33	16
Canada	7	17	7
FSU	53	0	53
W. Eur	53	66	53
Austrl	6	13	6
E. Eur	20	0	20
China	0	0	1000000000000000000
India	0	0	1000000000000000000
Korea	0	0	1000000000000000000
Mexico	0	0	1000000000000000000
ROW	0	0	1000000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	buy cap
Canada	none
FSU	sell cap
W. Eur	sell cap
Austrl	none
E. Eur	sell cap
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
 The market price for Umbrella country permits = \$ 98.399789

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	98.44	23702.70	417.51	0.00	-74.49	7329.80
Japan	124.27	6133.97	48.22	0.00	-34.78	3422.34
Canada	98.45	2084.82	24.70	0.00	-10.30	1013.52
FSU	0.00	-5194.52	0.00	0.00	52.79	-5194.52
W. Eur	67.76	-1492.87	119.42	0.00	53.42	-5256.52
Austrl	98.40	1382.43	18.85	0.00	-6.15	605.16
E. Eur	0.00	-1919.78	0.00	0.00	19.51	-1919.78
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	0.85	0.15	0.00	1.00
Japan	0.58	0.42	0.00	1.00
Canada	0.71	0.29	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	1.81	-0.81	0.00	1.00
Austrl	0.75	0.25	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO					
Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	144.99	60.42	78.01	-71.07	-29.14
Japan	209.30	108.24	156.07	-45.80	32.74
Canada	145.02	81.30	101.24	-54.68	10.99
FSU	-100.00	-9.30	-100.00	-75.62	-40.30
W. Eur	68.65	-239.62	56.23	411.84	1153.49
Austrl	144.90	74.10	88.96	-59.07	0.25
E. Eur	-100.00	-60.27	-100.00	-85.26	-63.91
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

END OF PRINTOUT

 TRADING SCENARIO

Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1434	492	0	Umbrella
Japan	302	83	0	Umbrella
Canada	141	35	0	Umbrella
FSU	1054	0	0	Umbrella
W. Eur	1024	66	0	Umbrella
Austrl	118	25	0	Umbrella
E. Eur	511	0	0	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

 RESULTS WITH NO TRADING OR CDM CONSTRAINTS

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	40.18	14775.71	234.54	-257.46	10344.65
Japan	40.18	2945.62	18.83	-64.17	2578.29
Canada	40.18	1149.93	12.27	-22.73	913.13
FSU	40.18	-5727.13	157.55	216.55	-8700.98
W. Eur	40.18	1069.26	76.44	10.44	-419.35
Austrl	40.18	794.06	9.98	-15.02	603.66
E. Eur	40.18	-4832.29	24.39	132.39	-5319.40
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

 CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.
 EU Cap Scenario: The buying cap is the EU formula base cap only.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	199	0	199
Japan	35	0	35
Canada	13	0	13
FSU	53	0	53
W. Eur	53	0	53
Austrl	8	0	8
E. Eur	26	0	26
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	buy cap
Japan	buy cap
Canada	buy cap
FSU	none
W. Eur	none
Austrl	buy cap
E. Eur	none
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits =	\$	0.00000000
The market price for Umbrella country permits =	\$	53.783820

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	56.46	17539.22	292.80	0.00	-199.20	10713.74
Japan	124.27	4582.22	48.22	0.00	-34.78	1870.60
Canada	83.25	1518.03	21.80	0.00	-13.20	709.95
FSU	53.78	-6012.98	190.15	0.00	190.15	-10226.99
W. Eur	53.78	745.19	98.41	0.00	32.41	-1743.13
Austrl	85.82	1044.14	17.18	0.00	-7.82	420.59
E. Eur	53.77	-879.94	32.44	0.00	32.44	-1744.75
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	0.60	0.40	0.00	1.00
Japan	0.58	0.42	0.00	1.00
Canada	0.62	0.38	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	1.49	-0.49	0.00	1.00
Austrl	0.69	0.31	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO					
Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	40.52	18.70	24.84	-22.63	3.57
Japan	209.30	55.56	156.07	-45.80	-27.45
Canada	107.20	32.01	77.61	-41.92	-22.25
FSU	33.86	4.99	20.69	-12.19	17.54
W. Eur	33.86	-30.31	28.75	210.53	315.68
Austrl	113.60	31.49	72.22	-47.95	-30.33
E. Eur	33.82	-81.79	33.00	-75.50	-67.20
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

END OF PRINTOUT

TRADING SCENARIO				
Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1434	492	0	Umbrella
Japan	302	83	0	Umbrella
Canada	141	35	0	Umbrella
FSU	1054	0	59	Umbrella
W. Eur	1024	66	0	Umbrella
Austrl	118	25	0	Umbrella
E. Eur	511	0	108	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

RESULTS WITH NO TRADING OR CDM CONSTRAINTS					
Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	40.18	14775.71	234.54	-257.46	10344.65
Japan	40.18	2945.62	18.83	-64.17	2578.29
Canada	40.18	1149.93	12.27	-22.73	913.13
FSU	40.18	-5727.13	157.55	216.55	-8700.98
W. Eur	40.18	1069.26	76.44	10.44	-419.35
Austrl	40.18	794.06	9.98	-15.02	603.66
E. Eur	40.18	-4832.29	24.39	132.39	-5319.40
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.
EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	199	225	424
Japan	35	6	42
Canada	13	12	25
FSU	53	0	53
W. Eur	53	66	120
Austrl	8	11	20
E. Eur	26	0	26
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

EU FORMULA SELLING CAPS			
Country	EU base selling cap (MMTCE)	Real reductions above base cap (MMTCE)	Total EU selling cap (MMTCE)
US	74	349	74
Japan	16	26	16
Canada	7	18	7
FSU	53	0	53
W. Eur	53	66	53
Austrl	6	13	6
E. Eur	20	0	20
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	buy cap
Canada	none
FSU	sell cap
W. Eur	sell cap
Austrl	none
E. Eur	sell cap
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits =	\$	0.00000000
The market price for Umbrella country permits =	\$	100.84194

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	100.84	23877.03	423.81	0.00	-68.19	6876.41
Japan	101.65	6134.22	41.16	0.00	-41.84	4219.23
Canada	100.84	2109.45	25.14	0.00	-9.86	994.30
FSU	0.00	-5323.45	0.00	0.00	52.79	-5323.45
W. Eur	67.77	-1623.66	119.43	0.00	53.43	-5387.98
Austrl	100.82	1397.07	19.16	0.00	-5.84	588.92
E. Eur	0.00	-1967.43	0.00	0.00	19.51	-1967.43
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	0.86	0.14	0.00	1.00
Japan	0.50	0.50	0.00	1.00
Canada	0.72	0.28	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	1.81	-0.81	0.00	1.00
Austrl	0.77	0.23	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO

Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	150.98	61.60	80.70	-73.51	-33.53
Japan	153.00	108.25	118.58	-34.80	63.64
Canada	150.96	83.44	104.83	-56.61	8.89
FSU	-100.00	-7.05	-100.00	-75.62	-38.82
W. Eur	68.67	-251.85	56.25	411.93	1184.84
Austrl	150.92	75.94	92.06	-61.13	-2.44
E. Eur	-100.00	-59.29	-100.00	-85.26	-63.01
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

END OF PRINTOUT

TRADING SCENARIO				
Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1434	492	0	Umbrella
Japan	302	83	0	Umbrella
Canada	141	35	0	Umbrella
FSU	1054	0	0	Umbrella
W. Eur	1024	66	0	Umbrella
Austrl	118	25	0	Umbrella
E. Eur	511	0	0	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

RESULTS WITH NO TRADING OR CDM CONSTRAINTS					
Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	40.18	14775.71	234.54	-257.46	10344.65
Japan	40.18	2945.62	18.83	-64.17	2578.29
Canada	40.18	1149.93	12.27	-22.73	913.13
FSU	40.18	-5727.13	157.55	216.55	-8700.98
W. Eur	40.18	1069.26	76.44	10.44	-419.35
Austrl	40.18	794.06	9.98	-15.02	603.66
E. Eur	40.18	-4832.29	24.39	132.39	-5319.40
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.
EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	199	95	295
Japan	35	6	42
Canada	13	4	18
FSU	53	145	198
W. Eur	53	50	104
Austrl	8	5	14
E. Eur	26	9	35
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	buy cap
Canada	buy cap
FSU	none
W. Eur	none
Austrl	none
E. Eur	none
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
 The market price for Umbrella country permits = \$ 57.011935

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	57.01	18181.75	294.67	0.00	-197.33	11250.17
Japan	101.65	4300.37	41.16	0.00	-41.84	2385.38
Canada	60.41	1491.15	17.04	0.00	-17.96	1023.93
FSU	57.01	-6638.77	197.52	0.00	197.52	-11261.00
W. Eur	57.01	632.52	103.38	0.00	37.38	-2131.11
Austrl	56.95	1009.48	12.89	0.00	-12.11	690.41
E. Eur	57.00	-987.76	34.34	0.00	34.34	-1957.79
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$) = 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	0.60	0.40	0.00	1.00
Japan	0.50	0.50	0.00	1.00
Canada	0.49	0.51	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	1.57	-0.57	0.00	1.00
Austrl	0.52	0.48	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO					
Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	41.89	23.05	25.64	-23.36	8.75
Japan	153.00	45.99	118.58	-34.80	-7.48
Canada	50.34	29.67	38.83	-20.97	12.13
FSU	41.89	15.92	25.37	-8.79	29.42
W. Eur	41.89	-40.84	35.25	258.15	408.19
Austrl	41.75	27.13	29.21	-19.40	14.37
E. Eur	41.87	-79.56	40.79	-74.06	-63.20
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

END OF PRINTOUT

FAX COVER SHEET

U.S. Department of State
Bureau of Economic and Business Affairs
Room 6828
2201 C Street, NW
Washington, DC 20520

TO: *Adele Morris*
622 - 1294 fax

FROM: Victoria Greenfield
(202) 647 - 5713 (fax)
(202) 647 - 6985 (phone)

Number of pages including cover sheet: *3*

Subject and/or message: *EU Spreadsheet Data*

CC: *Joe Aldy*

CO₂ equivalents

	tgt reduction	2010 BAU	"Best" Buy Cap	Sell Cap
US	1820851	7134.036	738.022	275.663
Japan	305971	1424.906	128.882	57.727
Canada	128.752	653.140	49.006	27.056
FSU	-218.305	3686.340	~~2778.8~~ 195.532	195.232
W. Europe	244.238	4037.815	197.904	197.904
Australia	40.813	529.810	28.954	21.089
E. Europe	NA	NA	NA	72.294

notes: FSU = Russia + Ukraine

Russia tgt reduction = -79,967 (-22 mmtce)

Ukraine tgt reduction = -138,338 (-37 mmtce)

W. Europe = European Union

E. Europe = partial list of EIT's.

NA = not available

Note: EU data shows almost no Russian "hot air"

Carbon Equivalents (0.27 x CO₂ equiv.)

	tgt reduction	2010 BAU	"Best" Buy Cap	Sell Cap
U.S.	492	1926	199	74
Japan	83	385	35	~~21~~ 16
Canada	35	176	13	7
FSU	-59	995	53	53
W. Europe	66	1090	53	53
Australia	25	143	8	6
E. Europe	NA	NA	NA	~~19~~ 20

← coincidentally round to same #.

See next page for #1's with 2 decimal places.

$$\text{MMTCE} = 0.27 \times \text{CO}_2 \text{ equivalent}$$

	tgt reduction	2010 BAU	"Best" Buy Cap	Sell Cap
U.S.	491.63	1926.19	199.27	74.43
Japan	82.61	384.70	34.78	16.58
Canada	34.76	176.35	13.23	7.31
FSU	- 58.94	995.31	52.79	52.79
W. Europe	65.94	1090.21	53.43	53.43
Australia	24.52	142.78	7.82	5.69
E. Europe	NA	NA	NA	19.52

***** U N C L A S S I F I E D *****

FACSIMILE COVER SHEET
U.S. DEPARTMENT OF TREASURY
OFFICE OF ECONOMIC POLICY

DATE:

NUMBER OF PAGES TO FOLLOW: 12FAX TO: Joe Aldy Fax: 395-6870
Victoria Greenfield Fax: 647-5713

ADDRESSEE'S FAX NUMBER _____

ADDRESSEE'S CONFIRMATION NUMBER _____

FAX FROM: Adela Morris

SENDER'S FAX NUMBERS: (202) 622-1294

SENDER'S CONFIRMATION NUMBER: 622-2350

COMMENTS/SPECIAL INSTRUCTIONS:

I welcome your comments
on the output. Now I'm
going to work on incorporating
EU #5. (Joe - runs in electronic
version I'm sending are in a different
order)

 TRADING SCENARIO

Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1515	600	0	Umbrella
Japan	266	113	0	Umbrella
Canada	129	62	0	Umbrella
FSU	1313	0	318	Umbrella
W. Eur	940	277	0	Umbrella
Austrl	89	21	0	Umbrella
E. Eur	511	0	108	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

 RESULTS WITH NO TRADING OR CDM CONSTRAINTS

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	50.74	22718.84	282.29	-317.71	16122.21
Japan	50.74	5122.42	23.24	-89.76	4554.92
Canada	50.74	2745.47	15.02	-46.98	2384.15
FSU	50.74	-21329.99	189.49	507.49	-25752.36
W. Eur	50.74	11571.36	94.21	-182.79	9275.82
Austrl	50.74	738.40	12.10	-8.90	451.51
E. Eur	50.74	-6264.17	30.66	138.66	-7036.25
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

 CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.
 EU Cap Scenario: The buying cap is the EU formula base cap only.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	173.90	41326.28	589.51	0.00	-10.49	1824.23
Japan	226.78	13969.00	75.70	0.00	-37.30	6486.53
Canada	207.73	7153.94	41.80	0.00	-20.20	3512.81
FSU	0.00	-11416.64	0.00	0.00	65.65	-11416.64
W. Eur	173.90	23897.41	249.52	0.00	-27.48	4778.82
Austrl	153.83	837.93	25.28	0.00	4.28	-744.30
E. Eur	0.00	-4441.45	0.00	0.00	25.54	-4441.45
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	0.98	0.02	0.00	1.00
Japan	0.67	0.33	0.00	1.00
Canada	0.67	0.33	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	0.90	0.10	0.00	1.00
Austrl	1.20	-0.20	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO

Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	242.70	81.90	108.83	-96.70	-88.69
Japan	346.91	172.70	225.76	-58.45	42.41
Canada	309.36	160.57	178.36	-57.01	47.34
FSU	-100.00	-46.48	-100.00	-87.06	-55.67
W. Eur	242.70	106.52	164.87	-84.97	-48.48
Austrl	203.14	13.48	108.89	-148.10	-264.85
E. Eur	-100.00	-29.10	-100.00	-81.58	-36.88
China	.	.	.	.	.
India	.	.	.	.	.
Korea	.	.	.	.	.
Mexico	.	.	.	.	.
ROW	.	.	.	.	.

END OF PRINTOUT

 TRADING SCENARIO

Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1515	600	0	Umbrella
Japan	266	113	0	Umbrella
Canada	129	62	0	Umbrella
FSU	1313	0	318	Umbrella
W. Eur	940	277	0	Umbrella
Austrl	89	21	0	Umbrella
E. Eur	511	0	108	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

 RESULTS WITH NO TRADING OR CDM CONSTRAINTS

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	50.74	22718.84	282.29	-317.71	16122.21
Japan	50.74	5122.42	23.24	-89.76	4554.92
Canada	50.74	2745.47	15.02	-46.98	2384.15
FSU	50.74	-21329.99	189.49	507.49	-25752.36
W. Eur	50.74	11571.36	94.21	-182.79	9275.82
Austrl	50.74	738.40	12.10	-8.90	451.51
E. Eur	50.74	-6264.17	30.66	138.66	-7036.25
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

 CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	397	601
Japan	37	26	64
Canada	20	18	38
FSU	66	0	66
W. Eur	99	156	255
Austrl	5	20	26
E. Eur	26	0	26
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

EU FORMULA SELLING CAPS			
Country	EU base selling cap (MMTCE)	Real reductions above base cap (MMTCE)	Total EU selling cap (MMTCE)
US	79	521	79
Japan	14	50	14
Canada	7	31	7
FSU	66	0	66
W. Eur	49	206	49
Austrl	4	21	4
E. Eur	26	0	26
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	none
Canada	none
FSU	sell cap
W. Eur	none
Austrl	sell cap
E. Eur	sell cap
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits =	\$	0.00000000
The market price for Umbrella country permits =	\$	179.15852

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	179.16	41353.81	599.99	0.00	-0.01	1.79
Japan	179.15	13883.53	63.69	0.00	-49.31	8834.31
Canada	179.15	7203.63	37.80	0.00	-24.20	4335.64
FSU	0.00	-11761.76	0.00	0.00	65.65	-11761.76
W. Eur	179.16	24027.30	255.05	0.00	-21.95	3932.53
Austrl	153.83	815.43	25.28	0.00	4.28	-766.80
E. Eur	0.00	-4575.71	0.00	0.00	25.54	-4575.71
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	1.00	0.00	0.00	1.00
Japan	0.56	0.44	0.00	1.00
Canada	0.61	0.39	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	0.92	0.08	0.00	1.00
Austrl	1.20	-0.20	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO

Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	253.06	82.02	112.55	-100.00	-99.99
Japan	253.05	171.03	174.08	-45.07	93.95
Canada	253.04	162.38	151.72	-48.49	81.85
FSU	-100.00	-44.86	-100.00	-87.06	-54.33
W. Eur	253.06	107.64	170.74	-87.99	-57.60
Austrl	203.14	10.43	108.89	-148.10	-269.83
E. Eur	-100.00	-26.95	-100.00	-81.58	-34.97
China	.	.	.	.	.
India	.	.	.	.	.
Korea	.	.	.	.	.
Mexico	.	.	.	.	.
ROW	.	.	.	.	.

END OF PRINTOUT

 TRADING SCENARIO

Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1515	600	0	Umbrella
Japan	266	113	0	Umbrella
Canada	129	62	0	Umbrella
FSU	1313	0	0	Umbrella
W. Eur	940	277	0	Umbrella
Austrl	89	21	0	Umbrella
E. Eur	511	0	0	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

 RESULTS WITH NO TRADING OR CDM CONSTRAINTS

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	50.74	22718.84	282.29	-317.71	16122.21
Japan	50.74	5122.42	23.24	-89.76	4554.92
Canada	50.74	2745.47	15.02	-46.98	2384.15
FSU	50.74	-21329.99	189.49	507.49	-25752.36
W. Eur	50.74	11571.36	94.21	-182.79	9275.82
Austrl	50.74	738.40	12.10	-8.90	451.51
E. Eur	50.74	-6264.17	30.66	138.66	-7036.25
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

 CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.
 EU Cap Scenario: The buying cap is the EU formula base cap only.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	0	203
Japan	37	0	37
Canada	20	0	20
FSU	66	0	66
W. Eur	99	0	99
Austrl	5	0	5
E. Eur	26	0	26
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	buy cap
Canada	buy cap
FSU	none
W. Eur	buy cap
Austrl	none
E. Eur	none
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
 The market price for Umbrella country permits = \$ 99.275554

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	99.27	34488.78	419.71	0.00	-180.29	17898.39
Japan	226.78	11185.45	75.70	0.00	-37.30	3702.98
Canada	207.36	5641.08	41.75	0.00	-20.25	2010.33
FSU	99.28	-16816.92	280.58	0.00	280.58	-27854.74
W. Eur	111.07	18801.14	177.61	0.00	-99.39	9867.00
Austrl	99.25	990.67	18.96	0.00	-2.04	202.52
E. Eur	99.26	-2957.03	58.69	0.00	58.69	-5826.48
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	0.70	0.30	0.00	1.00
Japan	0.67	0.33	0.00	1.00
Canada	0.67	0.33	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	0.64	0.36	0.00	1.00
Austrl	0.90	0.10	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO

Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	95.64	51.81	48.68	-43.25	11.02
Japan	346.91	118.36	225.76	-58.45	-18.70
Canada	308.63	105.47	178.03	-56.90	-15.68
FSU	95.64	-21.16	48.07	-44.71	8.16
W. Eur	118.88	62.48	88.54	-45.63	6.37
Austrl	95.60	34.16	56.66	-77.07	-55.15
E. Eur	95.61	-52.79	91.42	-57.67	-17.19
China	.	.	.	.	.
India	.	.	.	.	.
Korea	.	.	.	.	.
Mexico	.	.	.	.	.
ROW	.	.	.	.	.

END OF PRINTOUT

 TRADING SCENARIO

Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1515	600	0	Umbrella
Japan	266	113	0	Umbrella
Canada	129	62	0	Umbrella
FSU	1313	0	0	Umbrella
W. Eur	940	277	0	Umbrella
Austrl	89	21	0	Umbrella
E. Eur	511	0	0	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

 RESULTS WITH NO TRADING OR CDM CONSTRAINTS

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	50.74	22718.84	282.29	-317.71	16122.21
Japan	50.74	5122.42	23.24	-89.76	4554.92
Canada	50.74	2745.47	15.02	-46.98	2384.15
FSU	50.74	-21329.99	189.49	507.49	-25752.36
W. Eur	50.74	11571.36	94.21	-182.79	9275.82
Austrl	50.74	738.40	12.10	-8.90	451.51
E. Eur	50.74	-6264.17	30.66	138.66	-7036.25
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

 CONSTRAINED TRADING/CDM RESULTS

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	235	439
Japan	37	19	57
Canada	20	11	31
FSU	66	227	293
W. Eur	99	72	172
Austrl	5	15	21
E. Eur	26	37	63
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	buy cap
Canada	buy cap
FSU	none
W. Eur	none
Austrl	none
E. Eur	none
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
The market price for Umbrella country permits = \$ 106.39577

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	106.39	35706.65	438.09	0.00	-161.91	17226.54
Japan	152.42	9864.23	56.41	0.00	-56.59	6020.94
Canada	137.32	5114.04	31.41	0.00	-30.59	3254.65
FSU	106.40	-18858.39	292.78	0.00	292.78	-31150.55
W. Eur	106.40	19495.13	171.74	0.00	-105.26	11199.22
Austrl	106.37	1001.95	19.86	0.00	-1.14	121.29
E. Eur	106.39	-3389.29	62.71	0.00	62.71	-6672.08
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	0.73	0.27	0.00	1.00
Japan	0.50	0.50	0.00	1.00
Canada	0.51	0.49	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	0.62	0.38	0.00	1.00
Austrl	0.95	0.05	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO					
Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	109.67	57.17	55.19	-49.04	6.85
Japan	200.37	92.57	142.75	-36.96	32.19
Canada	170.60	86.27	109.17	-34.89	36.51
FSU	109.67	-11.59	54.51	-42.31	20.96
W. Eur	109.67	68.48	82.30	-42.42	20.74
Austrl	109.62	35.69	64.10	-87.19	-73.14
E. Eur	109.65	-45.89	104.53	-54.77	-5.18
China	.	.	.	.	.
India	.	.	.	.	.
Korea	.	.	.	.	.
Mexico	.	.	.	.	.
ROW	.	.	.	.	.

END OF PRINTOUT

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 TRADING SCENARIO  
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Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1515	600	0	Umbrella
Japan	266	113	0	Umbrella
Canada	129	62	0	Umbrella
FSU	1313	0	318	Umbrella
W. Eur	940	277	0	Umbrella
Austrl	89	21	0	Umbrella
E. Eur	511	0	108	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

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 RESULTS WITH NO TRADING OR CDM CONSTRAINTS  
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Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	50.74	22718.84	282.29	-317.71	16122.21
Japan	50.74	5122.42	23.24	-89.76	4554.92
Canada	50.74	2745.47	15.02	-46.98	2384.15
FSU	50.74	-21329.99	189.49	507.49	-25752.36
W. Eur	50.74	11571.36	94.21	-182.79	9275.82
Austrl	50.74	738.40	12.10	-8.90	451.51
E. Eur	50.74	-6264.17	30.66	138.66	-7036.25
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

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 CONSTRAINED TRADING/CDM RESULTS  
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JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	397	601
Japan	37	26	64
Canada	20	18	38
FSU	66	0	66
W. Eur	99	156	255
Austrl	5	20	26
E. Eur	26	0	26
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

EU FORMULA SELLING CAPS			
Country	EU base selling cap (MMTCE)	Real reductions above base cap (MMTCE)	Total EU selling cap (MMTCE)
US	79	521	79
Japan	14	50	14
Canada	7	31	7
FSU	66	0	66
W. Eur	49	206	49
Austrl	4	21	4
E. Eur	26	0	26
China	0	0	1000000000000000
India	0	0	1000000000000000
Korea	0	0	1000000000000000
Mexico	0	0	1000000000000000
ROW	0	0	1000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	none
Canada	none
FSU	sell cap
W. Eur	none
Austrl	sell cap
E. Eur	sell cap
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits =	\$	0.00000000
The market price for Umbrella country permits =	\$	179.15852

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	179.16	41353.81	599.99	0.00	-0.01	1.79
Japan	179.15	13883.53	63.69	0.00	-49.31	8834.31
Canada	179.15	7203.63	37.80	0.00	-24.20	4335.64
FSU	0.00	-11761.76	0.00	0.00	65.65	-11761.76
W. Eur	179.16	24027.30	255.05	0.00	-21.95	3932.53
Austrl	153.83	815.43	25.28	0.00	4.28	-766.80
E. Eur	0.00	-4575.71	0.00	0.00	25.54	-4575.71
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM				
Country	Domestic Reduction from BAU	Net Umbrella purchases	Net CDM purchases	Total
US	1.00	0.00	0.00	1.00
Japan	0.56	0.44	0.00	1.00
Canada	0.61	0.39	0.00	1.00
FSU	0.00	0.00	0.00	0.00
W. Eur	0.92	0.08	0.00	1.00
Austrl	1.20	-0.20	0.00	1.00
E. Eur	0.00	0.00	0.00	0.00
China	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00

PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO					
Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	253.06	82.02	112.55	-100.00	-99.99
Japan	253.05	171.03	174.08	-45.07	93.95
Canada	253.04	162.38	151.72	-48.49	81.85
FSU	-100.00	-44.86	-100.00	-87.06	-54.33
W. Eur	253.06	107.64	170.74	-87.99	-57.60
Austrl	203.14	10.43	108.89	-148.10	-269.83
E. Eur	-100.00	-26.95	-100.00	-81.58	-34.97
China	.	.	.	.	.
India	.	.	.	.	.
Korea	.	.	.	.	.
Mexico	.	.	.	.	.
ROW	.	.	.	.	.

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TRADING SCENARIO  
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Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1515	600	0	Umbrella
Japan	266	113	0	Umbrella
Canada	129	62	0	Umbrella
FSU	1313	0	0	Umbrella
W. Eur	940	277	0	Umbrella
Austrl	89	21	0	Umbrella
E. Eur	511	0	0	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

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RESULTS WITH NO TRADING OR CDM CONSTRAINTS  
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Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	50.74	22718.84	282.29	-317.71	16122.21
Japan	50.74	5122.42	23.24	-89.76	4554.92
Canada	50.74	2745.47	15.02	-46.98	2384.15
FSU	50.74	-21329.99	189.49	507.49	-25752.36
W. Eur	50.74	11571.36	94.21	-182.79	9275.82
Austrl	50.74	738.40	12.10	-8.90	451.51
E. Eur	50.74	-6264.17	30.66	138.66	-7036.25
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

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CONSTRAINED TRADING/CDM RESULTS  
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JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	235	439
Japan	37	19	57
Canada	20	11	31
FSU	66	227	293
W. Eur	99	72	172
Austrl	5	15	21
E. Eur	26	37	63
China	0	0	10000000000000000
India	0	0	10000000000000000
Korea	0	0	10000000000000000
Mexico	0	0	10000000000000000
ROW	0	0	10000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	buy cap
Canada	buy cap
FSU	none
W. Eur	none
Austrl	none
E. Eur	none
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
The market price for Umbrella country permits = \$ 106.39577

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	106.39	35706.65	438.09	0.00	-161.91	17226.54
Japan	152.42	9864.23	56.41	0.00	-56.59	6020.94
Canada	137.32	5114.04	31.41	0.00	-30.59	3254.65
FSU	106.40	-18858.39	292.78	0.00	292.78	-31150.55
W. Eur	106.40	19495.13	171.74	0.00	-105.26	11199.22
Austrl	106.37	1001.95	19.86	0.00	-1.14	121.29
E. Eur	106.39	-3389.29	62.71	0.00	62.71	-6672.08
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

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PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM

| Country | Domestic<br>Reduction<br>from BAU | Net<br>Umbrella<br>purchases | Net<br>CDM<br>purchases | Total |
|---------|-----------------------------------|------------------------------|-------------------------|-------|
| US      | 0.73                              | 0.27                         | 0.00                    | 1.00  |
| Japan   | 0.50                              | 0.50                         | 0.00                    | 1.00  |
| Canada  | 0.51                              | 0.49                         | 0.00                    | 1.00  |
| FSU     | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| W. Eur  | 0.62                              | 0.38                         | 0.00                    | 1.00  |
| Austrl  | 0.95                              | 0.05                         | 0.00                    | 1.00  |
| E. Eur  | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| China   | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| India   | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Korea   | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Mexico  | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| ROW     | 0.00                              | 0.00                         | 0.00                    | 0.00  |

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PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO

Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	109.67	57.17	55.19	-49.04	6.85
Japan	200.37	92.57	142.75	-36.96	32.19
Canada	170.60	86.27	109.17	-34.89	36.51
FSU	109.67	-11.59	54.51	-42.31	20.96
W. Eur	109.67	68.48	82.30	-42.42	20.74
Austrl	109.62	35.69	64.10	-87.19	-73.14
E. Eur	109.65	-45.89	104.53	-54.77	-5.18
China	.	.	.	.	.
India	.	.	.	.	.
Korea	.	.	.	.	.
Mexico	.	.	.	.	.
ROW	.	.	.	.	.

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 TRADING SCENARIO  
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Country	Assigned amount (MMTCE)	Target reductions (MMTCE)	Hot Air (MMTCE)	Trading and CDM participation
US	1515	600	0	Umbrella
Japan	266	113	0	Umbrella
Canada	129	62	0	Umbrella
FSU	1313	0	0	Umbrella
W. Eur	940	277	0	Umbrella
Austrl	89	21	0	Umbrella
E. Eur	511	0	0	Umbrella
China	1379	0	0	Neither
India	373	0	0	Neither
Korea	90	0	0	Neither
Mexico	175	0	0	Neither
ROW	836	0	0	Neither

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 RESULTS WITH NO TRADING OR CDM CONSTRAINTS  
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Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	50.74	22718.84	282.29	-317.71	16122.21
Japan	50.74	5122.42	23.24	-89.76	4554.92
Canada	50.74	2745.47	15.02	-46.98	2384.15
FSU	50.74	-21329.99	189.49	507.49	-25752.36
W. Eur	50.74	11571.36	94.21	-182.79	9275.82
Austrl	50.74	738.40	12.10	-8.90	451.51
E. Eur	50.74	-6264.17	30.66	138.66	-7036.25
China	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

CDM adaptation fund (in millions of 1997\$) = 0.00000000

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 CONSTRAINED TRADING/CDM RESULTS  
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JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.
 EU Cap Scenario: The buying cap is the EU formula base cap only.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

EU FORMULA BUYING CAPS			
Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	0	203
Japan	37	0	37
Canada	20	0	20
FSU	66	0	66
W. Eur	99	0	99
Austrl	5	0	5
E. Eur	26	0	26
China	0	0	10000000000000000
India	0	0	10000000000000000
Korea	0	0	10000000000000000
Mexico	0	0	10000000000000000
ROW	0	0	10000000000000000

Country	Of sell cap and/or joint buy cap, which trading caps bind?
US	none
Japan	buy cap
Canada	buy cap
FSU	none
W. Eur	buy cap
Austrl	none
E. Eur	none
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
The market price for Umbrella country permits = \$ 99.275554

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Domestic Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	99.27	34488.78	419.71	0.00	-180.29	17898.39
Japan	226.78	11185.45	75.70	0.00	-37.30	3702.98
Canada	207.36	5641.08	41.75	0.00	-20.25	2010.33
FSU	99.28	-16816.92	280.58	0.00	280.58	-27854.74
W. Eur	111.07	18801.14	177.61	0.00	-99.39	9867.00
Austrl	99.25	990.67	18.96	0.00	-2.04	202.52
E. Eur	99.26	-2957.03	58.69	0.00	58.69	-5826.48
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

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 PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM

| Country | Domestic<br>Reduction<br>from BAU | Net<br>Umbrella<br>purchases | Net<br>CDM<br>purchases | Total |
|---------|-----------------------------------|------------------------------|-------------------------|-------|
| US      | 0.70                              | 0.30                         | 0.00                    | 1.00  |
| Japan   | 0.67                              | 0.33                         | 0.00                    | 1.00  |
| Canada  | 0.67                              | 0.33                         | 0.00                    | 1.00  |
| FSU     | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| W. Eur  | 0.64                              | 0.36                         | 0.00                    | 1.00  |
| Austrl  | 0.90                              | 0.10                         | 0.00                    | 1.00  |
| E. Eur  | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| China   | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| India   | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Korea   | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Mexico  | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| ROW     | 0.00                              | 0.00                         | 0.00                    | 0.00  |

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 PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO

Country	MC of last domestic ton (% change)	Resource Cost (% change)	Domestic Reduction from BAU (% change)	Net Exports (% change)	Net Transfers (% change)
US	95.64	51.81	48.68	-43.25	11.02
Japan	346.91	118.36	225.76	-58.45	-18.70
Canada	308.63	105.47	178.03	-56.90	-15.68
FSU	95.64	-21.16	48.07	-44.71	8.16
W. Eur	118.88	62.48	88.54	-45.63	6.37
Austrl	95.60	34.16	56.66	-77.07	-55.15
E. Eur	95.61	-52.79	91.42	-57.67	-17.19
China	.	.	.	.	.
India	.	.	.	.	.
Korea	.	.	.	.	.
Mexico	.	.	.	.	.
ROW	.	.	.	.	.

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 END OF PRINTOUT ~~~~~

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 TRADING SCENARIO
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| Country | Assigned<br>amount<br>(MMTCE) | Target<br>reductions<br>(MMTCE) | Hot<br>Air<br>(MMTCE) | Trading and CDM participation |
|---------|-------------------------------|---------------------------------|-----------------------|-------------------------------|
| US      | 1515                          | 600                             | 0                     | Umbrella                      |
| Japan   | 266                           | 113                             | 0                     | Umbrella                      |
| Canada  | 129                           | 62                              | 0                     | Umbrella                      |
| FSU     | 1313                          | 0                               | 318                   | Umbrella                      |
| W. Eur  | 940                           | 277                             | 0                     | Umbrella                      |
| Austrl  | 89                            | 21                              | 0                     | Umbrella                      |
| E. Eur  | 511                           | 0                               | 108                   | Umbrella                      |
| China   | 1379                          | 0                               | 0                     | Neither                       |
| India   | 373                           | 0                               | 0                     | Neither                       |
| Korea   | 90                            | 0                               | 0                     | Neither                       |
| Mexico  | 175                           | 0                               | 0                     | Neither                       |
| ROW     | 836                           | 0                               | 0                     | Neither                       |

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 RESULTS WITH NO TRADING OR CDM CONSTRAINTS
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| Country | MC of last<br>domestic ton<br>(1997 \$) | Resource<br>Cost<br>(millions \$1997) | Domestic<br>Reduction<br>from BAU<br>(MMTCE) | Net<br>Exports<br>(MMTCE) | Net<br>Transfers<br>(millions \$1997) |
|---------|-----------------------------------------|---------------------------------------|----------------------------------------------|---------------------------|---------------------------------------|
| US      | 50.74                                   | 22718.84                              | 282.29                                       | -317.71                   | 16122.21                              |
| Japan   | 50.74                                   | 5122.42                               | 23.24                                        | -89.76                    | 4554.92                               |
| Canada  | 50.74                                   | 2745.47                               | 15.02                                        | -46.98                    | 2384.15                               |
| FSU     | 50.74                                   | -21329.99                             | 189.49                                       | 507.49                    | -25752.36                             |
| W. Eur  | 50.74                                   | 11571.36                              | 94.21                                        | -182.79                   | 9275.82                               |
| Austrl  | 50.74                                   | 738.40                                | 12.10                                        | -8.90                     | 451.51                                |
| E. Eur  | 50.74                                   | -6264.17                              | 30.66                                        | 138.66                    | -7036.25                              |
| China   | 0.00                                    | 0.00                                  | 0.00                                         | 0.00                      | 0.00                                  |
| India   | 0.00                                    | 0.00                                  | 0.00                                         | 0.00                      | 0.00                                  |
| Korea   | 0.00                                    | 0.00                                  | 0.00                                         | 0.00                      | 0.00                                  |
| Mexico  | 0.00                                    | 0.00                                  | 0.00                                         | 0.00                      | 0.00                                  |
| ROW     | 0.00                                    | 0.00                                  | 0.00                                         | 0.00                      | 0.00                                  |

CDM adaptation fund (in millions of 1997\$) = 0.00000000

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 CONSTRAINED TRADING/CDM RESULTS
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JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.  
 EU Cap Scenario: The buying cap is the EU formula base cap only.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

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EU FORMULA BUYING CAPS

Country	EU base buying cap (MMTCE)	Real reductions above base cap that raise total cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	0	203
Japan	37	0	37
Canada	20	0	20
FSU	66	0	66
W. Eur	99	0	99
Austrl	5	0	5
E. Eur	26	0	26
China	0	0	10000000000000000
India	0	0	10000000000000000
Korea	0	0	10000000000000000
Mexico	0	0	10000000000000000
ROW	0	0	10000000000000000

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EU FORMULA SELLING CAPS

| Country | EU base<br>selling cap<br>(MMTCE) | Real reductions<br>above base cap<br>(MMTCE) | Total EU<br>selling cap<br>(MMTCE) |
|---------|-----------------------------------|----------------------------------------------|------------------------------------|
| US      | 79                                | 511                                          | 79                                 |
| Japan   | 14                                | 62                                           | 14                                 |
| Canada  | 7                                 | 35                                           | 7                                  |
| FSU     | 66                                | 0                                            | 66                                 |
| W. Eur  | 49                                | 200                                          | 49                                 |
| Austrl  | 4                                 | 21                                           | 4                                  |
| E. Eur  | 26                                | 0                                            | 26                                 |
| China   | 0                                 | 0                                            | 10000000000000000                  |
| India   | 0                                 | 0                                            | 10000000000000000                  |
| Korea   | 0                                 | 0                                            | 10000000000000000                  |
| Mexico  | 0                                 | 0                                            | 10000000000000000                  |
| ROW     | 0                                 | 0                                            | 10000000000000000                  |

~~~~~  
Country Of sell cap and/or joint buy cap,
 which trading caps bind?

US	none
Japan	buy cap
Canada	buy cap
FSU	sell cap
W. Eur	none
Austrl	sell cap
E. Eur	sell cap
China	N/A
India	N/A
Korea	N/A
Mexico	N/A
ROW	N/A

~~~~~  
Under this constrained trading scenario:

|                                                 |    |            |
|-------------------------------------------------|----|------------|
| The market price for CDM permits =              | \$ | 0.00000000 |
| The market price for Umbrella country permits = | \$ | 173.90163  |

| Country | MC of last domestic ton (1997 \$) | Resource Cost (millions \$1997) | Domestic Reduction from BAU (MMTCE) | Net CDM purchases (MMTCE) | Net Exports (MMTCE) | Net Transfers (millions \$1997) |
|---------|-----------------------------------|---------------------------------|-------------------------------------|---------------------------|---------------------|---------------------------------|
| US      | 173.90                            | 41326.28                        | 589.51                              | 0.00                      | -10.49              | 1824.23                         |
| Japan   | 226.78                            | 13969.00                        | 75.70                               | 0.00                      | -37.30              | 6486.53                         |
| Canada  | 207.73                            | 7153.94                         | 41.80                               | 0.00                      | -20.20              | 3512.81                         |
| FSU     | 0.00                              | -11416.64                       | 0.00                                | 0.00                      | 65.65               | -11416.64                       |
| W. Eur  | 173.90                            | 23897.41                        | 249.52                              | 0.00                      | -27.48              | 4778.82                         |
| Austrl  | 153.83                            | 837.93                          | 25.28                               | 0.00                      | 4.28                | -744.30                         |
| E. Eur  | 0.00                              | -4441.45                        | 0.00                                | 0.00                      | 25.54               | -4441.45                        |
| China   | 0.00                              | 0.00                            | 0.00                                | 0.00                      | 0.00                | 0.00                            |
| India   | 0.00                              | 0.00                            | 0.00                                | 0.00                      | 0.00                | 0.00                            |
| Korea   | 0.00                              | 0.00                            | 0.00                                | 0.00                      | 0.00                | 0.00                            |
| Mexico  | 0.00                              | 0.00                            | 0.00                                | 0.00                      | 0.00                | 0.00                            |
| ROW     | 0.00                              | 0.00                            | 0.00                                | 0.00                      | 0.00                | 0.00                            |

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

| PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM |                             |                        |                   |       |
|-----------------------------------------------------------------------|-----------------------------|------------------------|-------------------|-------|
| Country                                                               | Domestic Reduction from BAU | Net Umbrella purchases | Net CDM purchases | Total |
| US                                                                    | 0.98                        | 0.02                   | 0.00              | 1.00  |
| Japan                                                                 | 0.67                        | 0.33                   | 0.00              | 1.00  |
| Canada                                                                | 0.67                        | 0.33                   | 0.00              | 1.00  |
| FSU                                                                   | 0.00                        | 0.00                   | 0.00              | 0.00  |
| W. Eur                                                                | 0.90                        | 0.10                   | 0.00              | 1.00  |
| Austrl                                                                | 1.20                        | -0.20                  | 0.00              | 1.00  |
| E. Eur                                                                | 0.00                        | 0.00                   | 0.00              | 0.00  |
| China                                                                 | 0.00                        | 0.00                   | 0.00              | 0.00  |
| India                                                                 | 0.00                        | 0.00                   | 0.00              | 0.00  |
| Korea                                                                 | 0.00                        | 0.00                   | 0.00              | 0.00  |
| Mexico                                                                | 0.00                        | 0.00                   | 0.00              | 0.00  |
| ROW                                                                   | 0.00                        | 0.00                   | 0.00              | 0.00  |

| PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO |                                    |                          |                                        |                        |                          |
|------------------------------------------------------------------------------|------------------------------------|--------------------------|----------------------------------------|------------------------|--------------------------|
| Country                                                                      | MC of last domestic ton (% change) | Resource Cost (% change) | Domestic Reduction from BAU (% change) | Net Exports (% change) | Net Transfers (% change) |
| US                                                                           | 242.70                             | 81.90                    | 108.83                                 | -96.70                 | -88.69                   |
| Japan                                                                        | 346.91                             | 172.70                   | 225.76                                 | -58.45                 | 42.41                    |
| Canada                                                                       | 309.36                             | 160.57                   | 178.36                                 | -57.01                 | 47.34                    |
| FSU                                                                          | -100.00                            | -46.48                   | -100.00                                | -87.06                 | -55.67                   |
| W. Eur                                                                       | 242.70                             | 106.52                   | 164.87                                 | -84.97                 | -48.48                   |
| Austrl                                                                       | 203.14                             | 13.48                    | 108.89                                 | -148.10                | -264.85                  |
| E. Eur                                                                       | -100.00                            | -29.10                   | -100.00                                | -81.58                 | -36.88                   |
| China                                                                        | .                                  | .                        | .                                      | .                      | .                        |
| India                                                                        | .                                  | .                        | .                                      | .                      | .                        |
| Korea                                                                        | .                                  | .                        | .                                      | .                      | .                        |
| Mexico                                                                       | .                                  | .                        | .                                      | .                      | .                        |
| ROW                                                                          | .                                  | .                        | .                                      | .                      | .                        |

END OF PRINTOUT

# CDM results

## TRADING SCENARIO

| Country | Assigned amount (MMTCE) | Target reductions (MMTCE) | Hot Air (MMTCE) | Trading and CDM participation |
|---------|-------------------------|---------------------------|-----------------|-------------------------------|
| US      | 1515                    | 600                       | 0               | Umbrella                      |
| Japan   | 266                     | 113                       | 0               | Umbrella                      |
| Canada  | 129                     | 62                        | 0               | Umbrella                      |
| FSU     | 1313                    | 0                         | 318             | Umbrella                      |
| W. Eur  | 940                     | 277                       | 0               | Umbrella                      |
| Austrl  | 89                      | 21                        | 0               | Umbrella                      |
| E. Eur  | 511                     | 0                         | 108             | Umbrella                      |
| China   | 1379                    | 0                         | 0               | CDM                           |
| India   | 373                     | 0                         | 0               | CDM                           |
| Korea   | 90                      | 0                         | 0               | CDM                           |
| Mexico  | 175                     | 0                         | 0               | CDM                           |
| ROW     | 836                     | 0                         | 0               | CDM                           |

## RESULTS WITH NO TRADING OR CDM CONSTRAINTS

| Country | MC of last domestic ton (1997 \$) | Resource Cost (millions \$1997) | Domestic Reduction from BAU (MMTCE) | Net Exports (MMTCE) | Net Transfers (millions \$1997) |
|---------|-----------------------------------|---------------------------------|-------------------------------------|---------------------|---------------------------------|
| US      | 40.50                             | 19230.76                        | 236.06                              | -363.94             | 14738.48                        |
| Japan   | 40.50                             | 4180.85                         | 18.97                               | -94.03              | 3808.05                         |
| Canada  | 40.50                             | 2250.54                         | 12.36                               | -49.64              | 2010.29                         |
| FSU     | 40.50                             | -16284.60                       | 158.57                              | 476.57              | -19299.44                       |
| W. Eur  | 40.50                             | 9610.66                         | 76.98                               | -200.02             | 8099.96                         |
| Austrl  | 40.50                             | 636.83                          | 10.04                               | -10.96              | 443.73                          |
| E. Eur  | 40.50                             | -4874.31                        | 24.58                               | 132.58              | -5369.04                        |
| China   | 40.50                             | -1767.24                        | 74.51                               | 74.51               | -3108.00                        |
| India   | 40.50                             | -259.74                         | 11.75                               | 11.75               | -490.02                         |
| Korea   | 40.50                             | -20.16                          | 0.95                                | 0.95                | -39.75                          |
| Mexico  | 40.50                             | -126.52                         | 5.80                                | 5.80                | -242.02                         |
| ROW     | 40.50                             | -349.55                         | 16.43                               | 16.43               | -685.19                         |

CDM adaptation fund (in millions of 1997\$) = 132.96076

## CONSTRAINED TRADING/CDM RESULTS

### JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.  
EU Cap Scenario: The buying cap is the EU formula base cap only.

### SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

| EU FORMULA BUYING CAPS |                                  |                                                                      |                                   |
|------------------------|----------------------------------|----------------------------------------------------------------------|-----------------------------------|
| Country                | EU base<br>buying cap<br>(MMTCE) | Real reductions<br>above base cap<br>that raise total cap<br>(MMTCE) | Total EU<br>buying cap<br>(MMTCE) |
| US                     | 203                              | 0                                                                    | 203                               |
| Japan                  | 37                               | 0                                                                    | 37                                |
| Canada                 | 20                               | 0                                                                    | 20                                |
| FSU                    | 66                               | 0                                                                    | 66                                |
| W. Eur                 | 99                               | 0                                                                    | 99                                |
| Austrl                 | 5                                | 0                                                                    | 5                                 |
| E. Eur                 | 26                               | 0                                                                    | 26                                |
| China                  | 0                                | 0                                                                    | 0                                 |
| India                  | 0                                | 0                                                                    | 0                                 |
| Korea                  | 0                                | 0                                                                    | 0                                 |
| Mexico                 | 0                                | 0                                                                    | 0                                 |
| ROW                    | 0                                | 0                                                                    | 0                                 |

| EU FORMULA SELLING CAPS |                                   |                                              |                                    |
|-------------------------|-----------------------------------|----------------------------------------------|------------------------------------|
| Country                 | EU base<br>selling cap<br>(MMTCE) | Real reductions<br>above base cap<br>(MMTCE) | Total EU<br>selling cap<br>(MMTCE) |
| US                      | 79                                | 385                                          | 79                                 |
| Japan                   | 14                                | 62                                           | 14                                 |
| Canada                  | 7                                 | 35                                           | 7                                  |
| FSU                     | 66                                | 0                                            | 66                                 |
| W. Eur                  | 49                                | 135                                          | 49                                 |
| Austrl                  | 4                                 | 14                                           | 4                                  |
| E. Eur                  | 26                                | 0                                            | 26                                 |
| China                   | 0                                 | 0                                            | 0                                  |
| India                   | 0                                 | 0                                            | 0                                  |
| Korea                   | 0                                 | 0                                            | 0                                  |
| Mexico                  | 0                                 | 0                                            | 0                                  |
| ROW                     | 0                                 | 0                                            | 0                                  |

| Country | Of sell cap and/or joint buy cap,<br>which trading caps bind? |
|---------|---------------------------------------------------------------|
| US      | none                                                          |
| Japan   | buy cap                                                       |
| Canada  | buy cap                                                       |
| FSU     | sell cap                                                      |
| W. Eur  | none                                                          |
| Austrl  | none                                                          |
| E. Eur  | sell cap                                                      |
| China   | N/A, CDM                                                      |
| India   | N/A, CDM                                                      |
| Korea   | N/A, CDM                                                      |
| Mexico  | N/A, CDM                                                      |
| ROW     | N/A, CDM                                                      |

Under this constrained trading scenario:

|                                                 |    |           |
|-------------------------------------------------|----|-----------|
| The market price for CDM permits =              | \$ | 93.407217 |
| The market price for Umbrella country permits = | \$ | 116.40816 |

| Country | MC of last<br>domestic<br>ton<br>(1997 \$) | Resource<br>Cost<br>(millions \$1997) | Domestic<br>Reduction<br>from BAU<br>(MMTCE) | Net<br>CDM<br>purchases<br>(MMTCE) | Net<br>Exports<br>(MMTCE) | Net<br>Transfers<br>(millions \$1997) |
|---------|--------------------------------------------|---------------------------------------|----------------------------------------------|------------------------------------|---------------------------|---------------------------------------|
| US      | 116.83                                     | 33389.11                              | 464.00                                       | 165.79                             | -136.00                   | 12018.18                              |
| Japan   | 226.78                                     | 11566.19                              | 75.70                                        | 11.23                              | -37.30                    | 4083.72                               |
| Canada  | 207.36                                     | 5669.68                               | 41.75                                        | 13.84                              | -20.25                    | 2038.93                               |
| FSU     | 0.00                                       | -7642.20                              | 0.00                                         | 0.00                               | 65.65                     | -7642.20                              |
| W. Eur  | 116.41                                     | 20486.29                              | 184.21                                       | 0.00                               | -92.79                    | 10801.51                              |
| Austrl  | 94.10                                      | 877.84                                | 18.29                                        | 7.00                               | -2.71                     | 154.46                                |
| E. Eur  | 0.00                                       | -2973.06                              | 0.00                                         | 0.00                               | 25.54                     | -2973.06                              |
| China   | 93.81                                      | -7250.31                              | 129.50                                       | -129.50                            | 129.50                    | 12096.23                              |
| India   | 93.41                                      | -1168.99                              | 22.08                                        | -22.08                             | 22.08                     | 2062.43                               |
| Korea   | 92.92                                      | -99.99                                | 2.01                                         | -2.01                              | 2.01                      | 187.75                                |
| Mexico  | 93.34                                      | -583.10                               | 11.19                                        | -11.19                             | 11.19                     | 1045.23                               |
| ROW     | 93.82                                      | -1673.22                              | 33.08                                        | -33.08                             | 33.08                     | 3089.91                               |

Constrained case: CDM adaptation fund (millions of 1997\$)= 554.44656

| PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM |                                   |                              |                         |       |
|-----------------------------------------------------------------------|-----------------------------------|------------------------------|-------------------------|-------|
| Country                                                               | Domestic<br>Reduction<br>from BAU | Net<br>Umbrella<br>purchases | Net<br>CDM<br>purchases | Total |
| US                                                                    | 0.77                              | -0.05                        | 0.28                    | 1.00  |
| Japan                                                                 | 0.67                              | 0.23                         | 0.10                    | 1.00  |
| Canada                                                                | 0.67                              | 0.10                         | 0.22                    | 1.00  |
| FSU                                                                   | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| W. Eur                                                                | 0.67                              | 0.33                         | 0.00                    | 1.00  |
| Austrl                                                                | 0.87                              | -0.20                        | 0.33                    | 1.00  |
| E. Eur                                                                | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| China                                                                 | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| India                                                                 | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Korea                                                                 | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Mexico                                                                | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| ROW                                                                   | 0.00                              | 0.00                         | 0.00                    | 0.00  |

| PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO |                                             |                                |                                                 |                              |                                |
|------------------------------------------------------------------------------|---------------------------------------------|--------------------------------|-------------------------------------------------|------------------------------|--------------------------------|
| Country                                                                      | MC of last<br>domestic<br>ton<br>(% change) | Resource<br>Cost<br>(% change) | Domestic<br>Reduction<br>from BAU<br>(% change) | Net<br>Exports<br>(% change) | Net<br>Transfers<br>(% change) |
| US                                                                           | 188.48                                      | 73.62                          | 96.56                                           | -62.63                       | -18.46                         |
| Japan                                                                        | 460.00                                      | 176.65                         | 299.13                                          | -60.33                       | 7.24                           |
| Canada                                                                       | 412.04                                      | 151.93                         | 237.81                                          | -59.21                       | 1.42                           |
| FSU                                                                          | -100.00                                     | -53.07                         | -100.00                                         | -86.22                       | -60.40                         |
| W. Eur                                                                       | 187.45                                      | 113.16                         | 139.28                                          | -53.61                       | 33.35                          |
| Austrl                                                                       | 132.36                                      | 37.85                          | 82.12                                           | -75.27                       | -65.19                         |
| E. Eur                                                                       | -100.00                                     | -39.01                         | -100.00                                         | -80.74                       | -44.63                         |
| China                                                                        | 131.65                                      | 310.26                         | 73.80                                           | 73.80                        | -489.20                        |
| India                                                                        | 130.65                                      | 350.06                         | 87.95                                           | 87.95                        | -520.89                        |
| Korea                                                                        | 129.45                                      | 395.92                         | 110.89                                          | 110.89                       | -572.27                        |
| Mexico                                                                       | 130.48                                      | 360.88                         | 92.86                                           | 92.86                        | -531.87                        |
| ROW                                                                          | 131.68                                      | 378.67                         | 101.38                                          | 101.38                       | -550.96                        |

~~~~~ END OF PRINTOUT ~~~~~

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 TRADING SCENARIO  
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| Country | Assigned
amount
(MMTCE) | Target
reductions
(MMTCE) | Hot
Air
(MMTCE) | Trading and CDM participation |
|---------|-------------------------------|---------------------------------|-----------------------|-------------------------------|
| US | 1515 | 600 | 0 | Umbrella |
| Japan | 266 | 113 | 0 | Umbrella |
| Canada | 129 | 62 | 0 | Umbrella |
| FSU | 1313 | 0 | 318 | Umbrella |
| W. Eur | 940 | 277 | 0 | Umbrella |
| Austrl | 89 | 21 | 0 | Umbrella |
| E. Eur | 511 | 0 | 108 | Umbrella |
| China | 1379 | 0 | 0 | CDM |
| India | 373 | 0 | 0 | CDM |
| Korea | 90 | 0 | 0 | CDM |
| Mexico | 175 | 0 | 0 | CDM |
| ROW | 836 | 0 | 0 | CDM |

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 RESULTS WITH NO TRADING OR CDM CONSTRAINTS  
 ~~~~~

| Country | MC of last
domestic ton
(1997 \$) | Resource
Cost
(millions \$1997) | Domestic
Reduction
from BAU
(MMTCE) | Net
Exports
(MMTCE) | Net
Transfers
(millions \$1997) |
|---------|---|---------------------------------------|--|---------------------------|---------------------------------------|
| US | 40.50 | 19230.76 | 236.06 | -363.94 | 14738.48 |
| Japan | 40.50 | 4180.85 | 18.97 | -94.03 | 3808.05 |
| Canada | 40.50 | 2250.54 | 12.36 | -49.64 | 2010.29 |
| FSU | 40.50 | -16284.60 | 158.57 | 476.57 | -19299.44 |
| W. Eur | 40.50 | 9610.66 | 76.98 | -200.02 | 8099.96 |
| Austrl | 40.50 | 636.83 | 10.04 | -10.96 | 443.73 |
| E. Eur | 40.50 | -4874.31 | 24.58 | 132.58 | -5369.04 |
| China | 40.50 | -1767.24 | 74.51 | 74.51 | -3108.00 |
| India | 40.50 | -259.74 | 11.75 | 11.75 | -490.02 |
| Korea | 40.50 | -20.16 | 0.95 | 0.95 | -39.75 |
| Mexico | 40.50 | -126.52 | 5.80 | 5.80 | -242.02 |
| ROW | 40.50 | -349.55 | 16.43 | 16.43 | -685.19 |

CDM adaptation fund (in millions of 1997\$) = 132.96076

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 CONSTRAINED TRADING/CDM RESULTS  
 ~~~~~

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than the base amount allowed by the EU formula.

| ~~~~~
EU FORMULA BUYING CAPS | | | |
|---------------------------------|----------------------------------|--|-----------------------------------|
| Country | EU base
buying cap
(MMTCE) | Real reductions
above base cap
that raise total cap
(MMTCE) | Total EU
buying cap
(MMTCE) |
| US | 203 | 372 | 576 |
| Japan | 37 | 23 | 60 |
| Canada | 20 | 15 | 36 |
| FSU | 66 | 0 | 66 |
| W. Eur | 99 | 142 | 241 |
| Austrl | 5 | 18 | 24 |
| E. Eur | 26 | 0 | 26 |
| China | 0 | 0 | 0 |
| India | 0 | 0 | 0 |
| Korea | 0 | 0 | 0 |
| Mexico | 0 | 0 | 0 |
| ROW | 0 | 0 | 0 |

| ~~~~~
EU FORMULA SELLING CAPS | | | |
|----------------------------------|-----------------------------------|--|------------------------------------|
| Country | EU base
selling cap
(MMTCE) | Real reductions
above base cap
(MMTCE) | Total EU
selling cap
(MMTCE) |
| US | 79 | 496 | 79 |
| Japan | 14 | 46 | 14 |
| Canada | 7 | 29 | 7 |
| FSU | 66 | 0 | 66 |
| W. Eur | 49 | 192 | 49 |
| Austrl | 4 | 19 | 4 |
| E. Eur | 26 | 0 | 26 |
| China | 0 | 0 | 0 |
| India | 0 | 0 | 0 |
| Korea | 0 | 0 | 0 |
| Mexico | 0 | 0 | 0 |
| ROW | 0 | 0 | 0 |

| ~~~~~
Country | | Of sell cap and/or joint buy cap,
which trading caps bind? |
|------------------|----------|---|
| US | none | |
| Japan | none | |
| Canada | none | |
| FSU | sell cap | |
| W. Eur | none | |
| Austrl | none | |
| E. Eur | sell cap | |
| China | N/A, CDM | |
| India | N/A, CDM | |
| Korea | N/A, CDM | |
| Mexico | N/A, CDM | |
| ROW | N/A, CDM | |

Under this constrained trading scenario:

| | | |
|---|----|-----------|
| The market price for CDM permits = | \$ | 13.359685 |
| The market price for Umbrella country permits = | \$ | 163.81619 |

| Country | MC of last
domestic
ton
(1997 \$) | Resource
Cost
(millions \$1997) | Domestic
Reduction
from BAU
(MMTCE) | Net
CDM
purchases
(MMTCE) | Net
Exports
(MMTCE) | Net
Transfers
(millions \$1997) |
|---------|--|---------------------------------------|--|------------------------------------|---------------------------|---------------------------------------|
| US | 166.75 | 40707.94 | 575.00 | 2.78 | -25.00 | 3677.14 |
| Japan | 165.44 | 10192.12 | 60.01 | 19.30 | -52.99 | 5776.81 |
| Canada | 165.15 | 3550.35 | 35.74 | 21.70 | -26.26 | 1036.91 |
| FSU | 0.00 | -10754.53 | 0.00 | 0.00 | 65.65 | -10754.53 |
| W. Eur | 165.92 | 23417.99 | 241.00 | 1.00 | -36.00 | 5746.93 |
| Austrl | 136.38 | 632.25 | 23.39 | 1.89 | 2.39 | -675.88 |
| E. Eur | 0.00 | -4183.87 | 0.00 | 0.00 | 25.54 | -4183.87 |
| China | 13.36 | -245.12 | 33.51 | -33.51 | 33.51 | 447.68 |
| India | 13.35 | -32.15 | 4.62 | -4.62 | 4.62 | 61.72 |
| Korea | 13.36 | -2.30 | 0.34 | -0.34 | 0.34 | 4.54 |
| Mexico | 13.33 | -15.26 | 2.21 | -2.21 | 2.21 | 29.52 |
| ROW | 13.35 | -40.83 | 5.99 | -5.99 | 5.99 | 80.02 |

Constrained case: CDM adaptation fund (millions of 1997\$)= 18.704895

| PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM | | | | |
|---|-----------------------------------|------------------------------|-------------------------|-------|
| Country | Domestic
Reduction
from BAU | Net
Umbrella
purchases | Net
CDM
purchases | Total |
| US | 0.96 | 0.04 | 0.00 | 1.00 |
| Japan | 0.53 | 0.30 | 0.17 | 1.00 |
| Canada | 0.58 | 0.07 | 0.35 | 1.00 |
| FSU | 0.00 | 0.00 | 0.00 | 0.00 |
| W. Eur | 0.87 | 0.13 | 0.00 | 1.00 |
| Austrl | 1.11 | -0.20 | 0.09 | 1.00 |
| E. Eur | 0.00 | 0.00 | 0.00 | 0.00 |
| China | 0.00 | 0.00 | 0.00 | 0.00 |
| India | 0.00 | 0.00 | 0.00 | 0.00 |
| Korea | 0.00 | 0.00 | 0.00 | 0.00 |
| Mexico | 0.00 | 0.00 | 0.00 | 0.00 |
| ROW | 0.00 | 0.00 | 0.00 | 0.00 |

| PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO | | | | | |
|--|---|--------------------------------|---|------------------------------|--------------------------------|
| Country | MC of last
domestic
ton
(% change) | Resource
Cost
(% change) | Domestic
Reduction
from BAU
(% change) | Net
Exports
(% change) | Net
Transfers
(% change) |
| US | 311.76 | 111.68 | 143.59 | -93.13 | -75.05 |
| Japan | 308.52 | 143.78 | 216.40 | -43.65 | 51.70 |
| Canada | 307.81 | 57.76 | 189.18 | -47.10 | -48.42 |
| FSU | -100.00 | -33.96 | -100.00 | -86.22 | -44.28 |
| W. Eur | 309.71 | 143.67 | 213.05 | -82.00 | -29.05 |
| Austrl | 236.77 | -0.72 | 132.91 | -121.81 | -252.32 |
| E. Eur | -100.00 | -14.16 | -100.00 | -80.74 | -22.07 |
| China | -67.01 | -86.13 | -55.03 | -55.03 | -114.40 |
| India | -67.03 | -87.62 | -60.67 | -60.67 | -112.60 |
| Korea | -67.02 | -88.60 | -64.33 | -64.33 | -111.43 |
| Mexico | -67.09 | -87.94 | -61.91 | -61.91 | -112.20 |
| ROW | -67.02 | -88.32 | -63.54 | -63.54 | -111.68 |

~~~~~ END OF PRINTOUT ~~~~~

| ~~~~~<br>TRADING SCENARIO<br>~~~~~ |                               |                                 |                       |                               |
|------------------------------------|-------------------------------|---------------------------------|-----------------------|-------------------------------|
| Country                            | Assigned<br>amount<br>(MMTCE) | Target<br>reductions<br>(MMTCE) | Hot<br>Air<br>(MMTCE) | Trading and CDM participation |
| US                                 | 1515                          | 600                             | 0                     | Umbrella                      |
| Japan                              | 266                           | 113                             | 0                     | Umbrella                      |
| Canada                             | 129                           | 62                              | 0                     | Umbrella                      |
| FSU                                | 1313                          | 0                               | 0                     | Umbrella                      |
| W. Eur                             | 940                           | 277                             | 0                     | Umbrella                      |
| Austrl                             | 89                            | 21                              | 0                     | Umbrella                      |
| E. Eur                             | 511                           | 0                               | 0                     | Umbrella                      |
| China                              | 1379                          | 0                               | 0                     | CDM                           |
| India                              | 373                           | 0                               | 0                     | CDM                           |
| Korea                              | 90                            | 0                               | 0                     | CDM                           |
| Mexico                             | 175                           | 0                               | 0                     | CDM                           |
| ROW                                | 836                           | 0                               | 0                     | CDM                           |

| ~~~~~<br>RESULTS WITH NO TRADING OR CDM CONSTRAINTS<br>~~~~~ |                                         |                                       |                                              |                           |                                       |
|--------------------------------------------------------------|-----------------------------------------|---------------------------------------|----------------------------------------------|---------------------------|---------------------------------------|
| Country                                                      | MC of last<br>domestic ton<br>(1997 \$) | Resource<br>Cost<br>(millions \$1997) | Domestic<br>Reduction<br>from BAU<br>(MMTCE) | Net<br>Exports<br>(MMTCE) | Net<br>Transfers<br>(millions \$1997) |
| US                                                           | 40.50                                   | 19230.76                              | 236.06                                       | -363.94                   | 14738.48                              |
| Japan                                                        | 40.50                                   | 4180.85                               | 18.97                                        | -94.03                    | 3808.05                               |
| Canada                                                       | 40.50                                   | 2250.54                               | 12.36                                        | -49.64                    | 2010.29                               |
| FSU                                                          | 40.50                                   | -16284.60                             | 158.57                                       | 476.57                    | -19299.44                             |
| W. Eur                                                       | 40.50                                   | 9610.66                               | 76.98                                        | -200.02                   | 8099.96                               |
| Austrl                                                       | 40.50                                   | 636.83                                | 10.04                                        | -10.96                    | 443.73                                |
| E. Eur                                                       | 40.50                                   | -4874.31                              | 24.58                                        | 132.58                    | -5369.04                              |
| China                                                        | 40.50                                   | -1767.24                              | 74.51                                        | 74.51                     | -3108.00                              |
| India                                                        | 40.50                                   | -259.74                               | 11.75                                        | 11.75                     | -490.02                               |
| Korea                                                        | 40.50                                   | -20.16                                | 0.95                                         | 0.95                      | -39.75                                |
| Mexico                                                       | 40.50                                   | -126.52                               | 5.80                                         | 5.80                      | -242.02                               |
| ROW                                                          | 40.50                                   | -349.55                               | 16.43                                        | 16.43                     | -685.19                               |

CDM adaptation fund (in millions of 1997\$) = 132.96076

~~~~~  
CONSTRAINED TRADING/CDM RESULTS
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JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.  
EU Cap Scenario: The buying cap is the EU formula base cap only.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

| EU FORMULA BUYING CAPS |                                  |                                                                      |                                   |
|------------------------|----------------------------------|----------------------------------------------------------------------|-----------------------------------|
| Country                | EU base<br>buying cap<br>(MMTCE) | Real reductions<br>above base cap<br>that raise total cap<br>(MMTCE) | Total EU<br>buying cap<br>(MMTCE) |
| US                     | 203                              | 0                                                                    | 203                               |
| Japan                  | 37                               | 0                                                                    | 37                                |
| Canada                 | 20                               | 0                                                                    | 20                                |
| FSU                    | 66                               | 0                                                                    | 66                                |
| W. Eur                 | 99                               | 0                                                                    | 99                                |
| Austrl                 | 5                                | 0                                                                    | 5                                 |
| E. Eur                 | 26                               | 0                                                                    | 26                                |
| China                  | 0                                | 0                                                                    | 0                                 |
| India                  | 0                                | 0                                                                    | 0                                 |
| Korea                  | 0                                | 0                                                                    | 0                                 |
| Mexico                 | 0                                | 0                                                                    | 0                                 |
| ROW                    | 0                                | 0                                                                    | 0                                 |

| Country | Of sell cap and/or joint buy cap,<br>which trading caps bind? |
|---------|---------------------------------------------------------------|
| US      | buy cap                                                       |
| Japan   | buy cap                                                       |
| Canada  | buy cap                                                       |
| FSU     | none                                                          |
| W. Eur  | buy cap                                                       |
| Austrl  | buy cap                                                       |
| E. Eur  | none                                                          |
| China   | N/A, CDM                                                      |
| India   | N/A, CDM                                                      |
| Korea   | N/A, CDM                                                      |
| Mexico  | N/A, CDM                                                      |
| ROW     | N/A, CDM                                                      |

Under this constrained trading scenario:

The market price for CDM permits = \$ 55.218763  
The market price for Umbrella country permits = \$ 55.248228

| Country | MC of last<br>domestic<br>ton<br>(1997 \$) | Resource<br>Cost<br>(millions \$1997) | Domestic<br>Reduction<br>from BAU<br>(MMTCE) | Net<br>CDM<br>purchases<br>(MMTCE) | Net<br>Exports<br>(MMTCE) | Net<br>Transfers<br>(millions \$1997) |
|---------|--------------------------------------------|---------------------------------------|----------------------------------------------|------------------------------------|---------------------------|---------------------------------------|
| US      | 90.87                                      | 25652.40                              | 397.19                                       | 86.31                              | -202.81                   | 11202.35                              |
| Japan   | 226.78                                     | 9542.87                               | 75.70                                        | 12.00                              | -37.30                    | 2060.41                               |
| Canada  | 207.36                                     | 4749.37                               | 41.75                                        | 5.25                               | -20.25                    | 1118.62                               |
| FSU     | 55.37                                      | -6293.90                              | 193.80                                       | 0.00                               | 193.80                    | -10707.11                             |
| W. Eur  | 111.02                                     | 14421.00                              | 177.55                                       | 31.14                              | -99.45                    | 5493.52                               |
| Austrl  | 77.53                                      | 803.89                                | 16.02                                        | 2.98                               | -4.98                     | 275.05                                |
| E. Eur  | 55.25                                      | -928.09                               | 33.31                                        | 0.00                               | 33.31                     | -1840.32                              |
| China   | 55.39                                      | -2993.40                              | 92.50                                        | -92.50                             | 92.50                     | 5107.74                               |
| India   | 55.30                                      | -456.72                               | 15.00                                        | -15.00                             | 15.00                     | 828.28                                |
| Korea   | 54.80                                      | -36.75                                | 1.27                                         | -1.27                              | 1.27                      | 70.13                                 |
| Mexico  | 55.16                                      | -224.35                               | 7.47                                         | -7.47                              | 7.47                      | 412.48                                |
| ROW     | 55.22                                      | -628.74                               | 21.44                                        | -21.44                             | 21.44                     | 1183.89                               |

Constrained case: CDM adaptation fund (millions of 1997\$)= 228.07558

| ~~~~~ PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM ~~~~~ |                                   |                              |                         |       |
|-----------------------------------------------------------------------------------|-----------------------------------|------------------------------|-------------------------|-------|
| Country                                                                           | Domestic<br>Reduction<br>from BAU | Net<br>Umbrella<br>purchases | Net<br>CDM<br>purchases | Total |
| US                                                                                | 0.66                              | 0.19                         | 0.14                    | 1.00  |
| Japan                                                                             | 0.67                              | 0.22                         | 0.11                    | 1.00  |
| Canada                                                                            | 0.67                              | 0.24                         | 0.08                    | 1.00  |
| FSU                                                                               | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| W. Eur                                                                            | 0.64                              | 0.25                         | 0.11                    | 1.00  |
| Austrl                                                                            | 0.76                              | 0.10                         | 0.14                    | 1.00  |
| E. Eur                                                                            | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| China                                                                             | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| India                                                                             | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Korea                                                                             | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| Mexico                                                                            | 0.00                              | 0.00                         | 0.00                    | 0.00  |
| ROW                                                                               | 0.00                              | 0.00                         | 0.00                    | 0.00  |

| ~~~~~ PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO ~~~~~ |                                             |                                |                                                 |                              |                                |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------|-------------------------------------------------|------------------------------|--------------------------------|
| Country                                                                                  | MC of last<br>domestic<br>ton<br>(% change) | Resource<br>Cost<br>(% change) | Domestic<br>Reduction<br>from BAU<br>(% change) | Net<br>Exports<br>(% change) | Net<br>Transfers<br>(% change) |
| US                                                                                       | 124.38                                      | 33.39                          | 68.26                                           | -44.27                       | -23.99                         |
| Japan                                                                                    | 460.00                                      | 128.25                         | 299.13                                          | -60.33                       | -45.89                         |
| Canada                                                                                   | 412.04                                      | 111.03                         | 237.81                                          | -59.21                       | -44.36                         |
| FSU                                                                                      | 36.73                                       | -61.35                         | 22.22                                           | -59.33                       | -44.52                         |
| W. Eur                                                                                   | 174.15                                      | 50.05                          | 130.63                                          | -50.28                       | -32.18                         |
| Austrl                                                                                   | 91.45                                       | 26.23                          | 59.52                                           | -54.55                       | -38.02                         |
| E. Eur                                                                                   | 36.43                                       | -80.96                         | 35.52                                           | -74.88                       | -65.72                         |
| China                                                                                    | 36.78                                       | 69.38                          | 24.14                                           | 24.14                        | -264.34                        |
| India                                                                                    | 36.56                                       | 75.84                          | 27.68                                           | 27.68                        | -269.03                        |
| Korea                                                                                    | 35.33                                       | 82.25                          | 33.25                                           | 33.25                        | -276.40                        |
| Mexico                                                                                   | 36.20                                       | 77.33                          | 28.74                                           | 28.74                        | -270.43                        |
| ROW                                                                                      | 36.35                                       | 79.87                          | 30.52                                           | 30.52                        | -272.78                        |

~~~~~ END OF PRINTOUT ~~~~~

~~~~~  
 TRADING SCENARIO  
 ~~~~~

| Country | Assigned
amount
(MMTCE) | Target
reductions
(MMTCE) | Hot
Air
(MMTCE) | Trading and CDM participation |
|---------|-------------------------------|---------------------------------|-----------------------|-------------------------------|
| US | 1515 | 600 | 0 | Umbrella |
| Japan | 266 | 113 | 0 | Umbrella |
| Canada | 129 | 62 | 0 | Umbrella |
| FSU | 1313 | 0 | 0 | Umbrella |
| W. Eur | 940 | 277 | 0 | Umbrella |
| Austrl | 89 | 21 | 0 | Umbrella |
| E. Eur | 511 | 0 | 0 | Umbrella |
| China | 1379 | 0 | 0 | CDM |
| India | 373 | 0 | 0 | CDM |
| Korea | 90 | 0 | 0 | CDM |
| Mexico | 175 | 0 | 0 | CDM |
| ROW | 836 | 0 | 0 | CDM |

~~~~~  
 RESULTS WITH NO TRADING OR CDM CONSTRAINTS  
 ~~~~~

| Country | MC of last
domestic ton
(1997 \$) | Resource
Cost
(millions \$1997) | Domestic
Reduction
from BAU
(MMTCE) | Net
Exports
(MMTCE) | Net
Transfers
(millions \$1997) |
|---------|---|---------------------------------------|--|---------------------------|---------------------------------------|
| US | 40.50 | 19230.76 | 236.06 | -363.94 | 14738.48 |
| Japan | 40.50 | 4180.85 | 18.97 | -94.03 | 3808.05 |
| Canada | 40.50 | 2250.54 | 12.36 | -49.64 | 2010.29 |
| FSU | 40.50 | -16284.60 | 158.57 | 476.57 | -19299.44 |
| W. Eur | 40.50 | 9610.66 | 76.98 | -200.02 | 8099.96 |
| Austrl | 40.50 | 636.83 | 10.04 | -10.96 | 443.73 |
| E. Eur | 40.50 | -4874.31 | 24.58 | 132.58 | -5369.04 |
| China | 40.50 | -1767.24 | 74.51 | 74.51 | -3108.00 |
| India | 40.50 | -259.74 | 11.75 | 11.75 | -490.02 |
| Korea | 40.50 | -20.16 | 0.95 | 0.95 | -39.75 |
| Mexico | 40.50 | -126.52 | 5.80 | 5.80 | -242.02 |
| ROW | 40.50 | -349.55 | 16.43 | 16.43 | -685.19 |

CDM adaptation fund (in millions of 1997\$) = 132.96076

~~~~~  
 CONSTRAINED TRADING/CDM RESULTS  
 ~~~~~

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

EU Cap Scenario: The buying cap can be adjusted upwards with sufficient real reductions.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

| EU FORMULA BUYING CAPS | | | |
|------------------------|----------------------------------|--|-----------------------------------|
| Country | EU base
buying cap
(MMTCE) | Real reductions
above base cap
that raise total cap
(MMTCE) | Total EU
buying cap
(MMTCE) |
| US | 203 | 161 | 365 |
| Japan | 37 | 19 | 57 |
| Canada | 20 | 10 | 31 |
| FSU | 66 | 178 | 244 |
| W. Eur | 99 | 39 | 139 |
| Austrl | 5 | 11 | 17 |
| E. Eur | 26 | 22 | 48 |
| China | 0 | 0 | 0 |
| India | 0 | 0 | 0 |
| Korea | 0 | 0 | 0 |
| Mexico | 0 | 0 | 0 |
| ROW | 0 | 0 | 0 |

| Country | Of sell cap and/or joint buy cap,
which trading caps bind? |
|---------|---|
| US | none |
| Japan | buy cap |
| Canada | buy cap |
| FSU | none |
| W. Eur | buy cap |
| Austrl | none |
| E. Eur | none |
| China | N/A, CDM |
| India | N/A, CDM |
| Korea | N/A, CDM |
| Mexico | N/A, CDM |
| ROW | N/A, CDM |

Under this constrained trading scenario:

The market price for CDM permits = \$ 79.079875
The market price for Umbrella country permits = \$ 79.078612

| Country | MC of last
domestic
ton
(1997 \$) | Resource
Cost
(millions \$1997) | Domestic
Reduction
from BAU
(MMTCE) | Net
CDM
purchases
(MMTCE) | Net
Exports
(MMTCE) | Net
Transfers
(millions \$1997) |
|---------|--|---------------------------------------|--|------------------------------------|---------------------------|---------------------------------------|
| US | 79.11 | 30293.97 | 364.00 | 102.72 | -236.00 | 18662.68 |
| Japan | 152.74 | 8324.98 | 56.50 | 15.60 | -56.50 | 4467.96 |
| Canada | 133.20 | 4240.78 | 30.74 | 9.31 | -31.26 | 2472.01 |
| FSU | 79.12 | -11517.67 | 243.60 | 0.00 | 243.60 | -19263.55 |
| W. Eur | 81.08 | 16135.84 | 138.30 | 45.09 | -138.70 | 10968.26 |
| Austrl | 79.07 | 922.49 | 16.24 | 3.73 | -4.76 | 376.42 |
| E. Eur | 79.08 | -1887.60 | 47.17 | 0.00 | 47.17 | -3730.14 |
| China | 79.15 | -5490.55 | 116.40 | -116.40 | 116.40 | 9204.90 |
| India | 79.07 | -870.34 | 19.58 | -19.58 | 19.58 | 1548.38 |
| Korea | 79.01 | -72.97 | 1.75 | -1.75 | 1.75 | 138.39 |
| Mexico | 79.08 | -432.02 | 9.88 | -9.88 | 9.88 | 781.31 |
| ROW | 79.06 | -1230.20 | 28.84 | -28.84 | 28.84 | 2280.66 |

Constrained case: CDM adaptation fund (millions of 1997\$)= 418.60932

| ~~~~~ PROPORTION OF (POSITIVE) TARGET REDUCTIONS MET THROUGH EACH MECHANISM ~~~~~ | | | | |
|---|-----------------------------------|------------------------------|-------------------------|-------|
| Country | Domestic
Reduction
from BAU | Net
Umbrella
purchases | Net
CDM
purchases | Total |
| US | 0.61 | 0.22 | 0.17 | 1.00 |
| Japan | 0.50 | 0.36 | 0.14 | 1.00 |
| Canada | 0.50 | 0.35 | 0.15 | 1.00 |
| FSU | 0.00 | 0.00 | 0.00 | 0.00 |
| W. Eur | 0.50 | 0.34 | 0.16 | 1.00 |
| Austrl | 0.77 | 0.05 | 0.18 | 1.00 |
| E. Eur | 0.00 | 0.00 | 0.00 | 0.00 |
| China | 0.00 | 0.00 | 0.00 | 0.00 |
| India | 0.00 | 0.00 | 0.00 | 0.00 |
| Korea | 0.00 | 0.00 | 0.00 | 0.00 |
| Mexico | 0.00 | 0.00 | 0.00 | 0.00 |
| ROW | 0.00 | 0.00 | 0.00 | 0.00 |

| ~~~~~ PERCENT CHANGE IN RESULTS FROM UNCONSTRAINED TO CONSTRAINED TRADING SCENARIO ~~~~~ | | | | | |
|--|---|--------------------------------|---|------------------------------|--------------------------------|
| Country | MC of last
domestic
ton
(% change) | Resource
Cost
(% change) | Domestic
Reduction
from BAU
(% change) | Net
Exports
(% change) | Net
Transfers
(% change) |
| US | 95.36 | 57.53 | 54.20 | -35.15 | 26.63 |
| Japan | 277.17 | 99.12 | 197.90 | -39.92 | 17.33 |
| Canada | 228.92 | 88.43 | 148.72 | -37.03 | 22.97 |
| FSU | 95.38 | -29.27 | 53.62 | -48.88 | -0.19 |
| W. Eur | 100.20 | 67.90 | 79.65 | -30.66 | 35.41 |
| Austrl | 95.26 | 44.86 | 61.71 | -56.56 | -15.17 |
| E. Eur | 95.27 | -61.27 | 91.90 | -64.42 | -30.53 |
| China | 95.44 | 210.69 | 56.22 | 56.22 | -396.17 |
| India | 95.26 | 235.08 | 66.67 | 66.67 | -415.98 |
| Korea | 95.10 | 261.90 | 83.61 | 83.61 | -448.11 |
| Mexico | 95.28 | 241.47 | 70.28 | 70.28 | -422.83 |
| ROW | 95.22 | 251.94 | 75.57 | 75.57 | -432.85 |

~~~~~ END OF PRINTOUT ~~~~~

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EU FORMULA SELLING CAPS

Country	EU base selling cap (MMTCE)	Real reductions above selling cap (MMTCE)	Total EU selling cap (MMTCE)
US	79	520	475
Japan	14	50	41
Canada	7	31	24
FSU	66	0	66
W. Eur	49	205	204
Austrl	4	23	28
E. Eur	26	0	26
China	0	0	1000000000000000000
India	0	0	1000000000000000000
Korea	0	0	1000000000000000000
Mexico	0	0	1000000000000000000
ROW	0	0	1000000000000000000

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
The market price for Umbrella country permits = \$ 178.39602

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	178.43	41353.23	598.55	0.00	-1.45	258.67
Japan	178.40	13845.86	63.49	0.00	-49.51	8832.39
Canada	178.39	7185.13	37.69	0.00	-24.31	4336.81
FSU	0.00	-11711.70	0.00	0.00	65.65	-11711.70
W. Eur	178.44	24010.26	254.30	0.00	-22.70	4049.59
Austrl	178.38	787.62	27.78	0.00	6.78	-1209.52
E. Eur	0.00	-4556.23	0.00	0.00	25.54	-4556.23
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

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END OF PRINTOUT

Annex I: EU buying cap, EU 5% rule selling cap

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 TRADING SCENARIO
 ~~~~~

| Country | Assigned<br>amount<br>(MMTCE) | Target<br>reductions<br>(MMTCE) | Hot<br>Air<br>(MMTCE) | Trading and CDM participation |
|---------|-------------------------------|---------------------------------|-----------------------|-------------------------------|
| US      | 1515                          | 600                             | 0                     | Umbrella                      |
| Japan   | 266                           | 113                             | 0                     | Umbrella                      |
| Canada  | 129                           | 62                              | 0                     | Umbrella                      |
| FSU     | 1313                          | 0                               | 318                   | Umbrella                      |
| W. Eur  | 940                           | 277                             | 0                     | Umbrella                      |
| Austrl  | 89                            | 21                              | 0                     | Umbrella                      |
| E. Eur  | 511                           | 0                               | 108                   | Umbrella                      |
| China   | 1379                          | 0                               | 0                     | Neither                       |
| India   | 373                           | 0                               | 0                     | Neither                       |
| Korea   | 90                            | 0                               | 0                     | Neither                       |
| Mexico  | 175                           | 0                               | 0                     | Neither                       |
| ROW     | 836                           | 0                               | 0                     | Neither                       |

~~~~~  
 RESULTS WITH NO TRADING OR CDM CONSTRAINTS
 ~~~~~

| Country | MC of last<br>domestic ton<br>(1997 \$) | Resource<br>Cost<br>(millions \$1997) | Reduction<br>from BAU<br>(MMTCE) | Net<br>Exports<br>(MMTCE) | Net<br>Transfers<br>(millions \$1997) |
|---------|-----------------------------------------|---------------------------------------|----------------------------------|---------------------------|---------------------------------------|
| US      | 50.74                                   | 22718.84                              | 282.29                           | -317.71                   | 16122.21                              |
| Japan   | 50.74                                   | 5122.42                               | 23.24                            | -89.76                    | 4554.92                               |
| Canada  | 50.74                                   | 2745.47                               | 15.02                            | -46.98                    | 2384.15                               |
| FSU     | 50.74                                   | -21329.99                             | 189.49                           | 507.49                    | -25752.36                             |
| W. Eur  | 50.74                                   | 11571.36                              | 94.21                            | -182.79                   | 9275.82                               |
| Austrl  | 50.74                                   | 738.40                                | 12.10                            | -8.90                     | 451.51                                |
| E. Eur  | 50.74                                   | -6264.17                              | 30.66                            | 138.66                    | -7036.25                              |
| China   | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| India   | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| Korea   | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| Mexico  | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| ROW     | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |

CDM adaptation fund (in millions of 1997\$) = 0.00000000

~~~~~  
 CONSTRAINED TRADING/CDM RESULTS
 ~~~~~

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no more than allowed by the EU formula.

~~~~~  
 EU FORMULA BUYING CAPS
 ~~~~~

| Country | EU base<br>buying cap<br>(MMTCE) | Real reductions<br>above buying cap<br>(MMTCE) | Total EU<br>buying cap<br>(MMTCE) |
|---------|----------------------------------|------------------------------------------------|-----------------------------------|
| US      | 203                              | 396                                            | 599                               |
| Japan   | 37                               | 26                                             | 64                                |
| Canada  | 20                               | 17                                             | 38                                |
| FSU     | 66                               | 0                                              | 66                                |
| W. Eur  | 99                               | 155                                            | 255                               |
| Austrl  | 5                                | 23                                             | 29                                |
| E. Eur  | 26                               | 0                                              | 26                                |
| China   | 0                                | 0                                              | 10000000000000000                 |
| India   | 0                                | 0                                              | 10000000000000000                 |
| Korea   | 0                                | 0                                              | 10000000000000000                 |
| Mexico  | 0                                | 0                                              | 10000000000000000                 |
| ROW     | 0                                | 0                                              | 10000000000000000                 |

~~~~~  
EU FORMULA BUYING CAPS

Country	EU base buying cap (MMTCE)	Real reductions above buying cap (MMTCE)	Total EU buying cap (MMTCE)
US	203	235	439
Japan	37	19	57
Canada	20	11	31
FSU	66	227	293
W. Eur	99	72	172
Austrl	5	15	21
E. Eur	26	37	63
China	0	0	10000000000000000
India	0	0	10000000000000000
Korea	0	0	10000000000000000
Mexico	0	0	10000000000000000
ROW	0	0	10000000000000000

Under this constrained trading scenario:

The market price for CDM permits = \$ 0.00000000
The market price for Umbrella country permits = \$ 106.39577

Country	MC of last domestic ton (1997 \$)	Resource Cost (millions \$1997)	Reduction from BAU (MMTCE)	Net CDM purchases (MMTCE)	Net Exports (MMTCE)	Net Transfers (millions \$1997)
US	106.39	35706.65	438.09	0.00	-161.91	17226.54
Japan	152.42	9864.23	56.41	0.00	-56.59	6020.94
Canada	137.32	5114.04	31.41	0.00	-30.59	3254.65
FSU	106.40	-18858.39	292.78	0.00	292.78	-31150.55
W. Eur	106.40	19495.13	171.74	0.00	-105.26	11199.22
Austrl	106.37	1001.95	19.86	0.00	-1.14	121.29
E. Eur	106.39	-3389.29	62.71	0.00	62.71	-6672.08
China	0.00	0.00	0.00	0.00	0.00	0.00
India	0.00	0.00	0.00	0.00	0.00	0.00
Korea	0.00	0.00	0.00	0.00	0.00	0.00
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00	0.00

Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

~~~~~ END OF PRINTOUT ~~~~~

*Annex I: EU buying cap, EU no hot air selling cap*

~~~~~  
 TRADING SCENARIO
 ~~~~~

| Country | Assigned<br>amount<br>(MMTCE) | Target<br>reductions<br>(MMTCE) | Hot<br>Air<br>(MMTCE) | Trading and CDM participation |
|---------|-------------------------------|---------------------------------|-----------------------|-------------------------------|
| US      | 1515                          | 600                             | 0                     | Umbrella                      |
| Japan   | 266                           | 113                             | 0                     | Umbrella                      |
| Canada  | 129                           | 62                              | 0                     | Umbrella                      |
| FSU     | 1313                          | 0                               | 0                     | Umbrella                      |
| W. Eur  | 940                           | 277                             | 0                     | Umbrella                      |
| Austrl  | 89                            | 21                              | 0                     | Umbrella                      |
| E. Eur  | 511                           | 0                               | 0                     | Umbrella                      |
| China   | 1379                          | 0                               | 0                     | Neither                       |
| India   | 373                           | 0                               | 0                     | Neither                       |
| Korea   | 90                            | 0                               | 0                     | Neither                       |
| Mexico  | 175                           | 0                               | 0                     | Neither                       |
| ROW     | 836                           | 0                               | 0                     | Neither                       |

~~~~~  
 RESULTS WITH NO TRADING OR CDM CONSTRAINTS
 ~~~~~

| Country | MC of last<br>domestic ton<br>(1997 \$) | Resource<br>Cost<br>(millions \$1997) | Reduction<br>from BAU<br>(MMTCE) | Net<br>Exports<br>(MMTCE) | Net<br>Transfers<br>(millions \$1997) |
|---------|-----------------------------------------|---------------------------------------|----------------------------------|---------------------------|---------------------------------------|
| US      | 50.74                                   | 22718.84                              | 282.29                           | -317.71                   | 16122.21                              |
| Japan   | 50.74                                   | 5122.42                               | 23.24                            | -89.76                    | 4554.92                               |
| Canada  | 50.74                                   | 2745.47                               | 15.02                            | -46.98                    | 2384.15                               |
| FSU     | 50.74                                   | -21329.99                             | 189.49                           | 507.49                    | -25752.36                             |
| W. Eur  | 50.74                                   | 11571.36                              | 94.21                            | -182.79                   | 9275.82                               |
| Austrl  | 50.74                                   | 738.40                                | 12.10                            | -8.90                     | 451.51                                |
| E. Eur  | 50.74                                   | -6264.17                              | 30.66                            | 138.66                    | -7036.25                              |
| China   | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| India   | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| Korea   | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| Mexico  | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |
| ROW     | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |

CDM adaptation fund (in millions of 1997\$) = 0.00000000

~~~~~  
 CONSTRAINED TRADING/CDM RESULTS
 ~~~~~

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

Under this constrained trading scenario:

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 The market price for CDM permits = \$ 0.00000000  
 The market price for Umbrella country permits = \$ 30.963512

```

~~~~~
 MC of last Resource Reduction Net Net Net
Country domestic Cost from BAU CDM Exports Transfers
 (1997 $) (millions $1997) (MMTCE) purchases (MMTCE) (millions $1997)

US 58.59 16528.72 300.00 0.00 -300.00 9289.05
Japan 152.21 5588.23 56.35 0.00 -56.65 1754.08
Canada 134.79 2763.48 31.00 0.00 -31.00 959.87
FSU 30.97 -2321.72 130.99 0.00 130.99 -4055.91
W. Eur 81.08 9462.21 138.30 0.00 -138.70 4294.64
Austral 40.35 519.77 10.01 0.00 -10.99 340.29
E. Eur 30.95 -293.74 18.87 0.00 18.87 -584.28
China 31.14 -5512.40 313.02 0.00 313.02 -9692.20
India 30.96 -789.11 47.44 0.00 47.44 -1468.91
Korea 30.92 -59.93 3.77 0.00 3.77 -116.73
Mexico 30.96 -381.56 23.25 0.00 23.25 -719.90
ROW 0.00 0.00 0.00 0.00 0.00 0.00

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Constrained case: CDM adaptation fund (millions of 1997\$)= 0.00000000

~~~~~ END OF PRINTOUT ~~~~~

*Annex I + Key LDC: EU buying caps, EU no hot air selling caps*

~~~~~  
 TRADING SCENARIO  
 ~~~~~

| Country | Assigned<br>amount<br>(MMTCE) | Target<br>reductions<br>(MMTCE) | Hot<br>Air<br>(MMTCE) | Trading and CDM participation |
|---------|-------------------------------|---------------------------------|-----------------------|-------------------------------|
| US      | 1515                          | 600                             | 0                     | Umbrella                      |
| Japan   | 266                           | 113                             | 0                     | Umbrella                      |
| Canada  | 129                           | 62                              | 0                     | Umbrella                      |
| FSU     | 1313                          | 0                               | 0                     | Umbrella                      |
| W. Eur  | 940                           | 277                             | 0                     | Umbrella                      |
| Austrl  | 89                            | 21                              | 0                     | Umbrella                      |
| E. Eur  | 511                           | 0                               | 0                     | Umbrella                      |
| China   | 1379                          | 0                               | 0                     | Umbrella                      |
| India   | 373                           | 0                               | 0                     | Umbrella                      |
| Korea   | 90                            | 0                               | 0                     | Umbrella                      |
| Mexico  | 175                           | 0                               | 0                     | Umbrella                      |
| ROW     | 836                           | 0                               | 0                     | Neither                       |

~~~~~  
 RESULTS WITH NO TRADING OR CDM CONSTRAINTS  
 ~~~~~

| Country | MC of last<br>domestic ton<br>(1997 \$) | Resource<br>Cost<br>(millions \$1997) | Reduction<br>from BAU<br>(MMTCE) | Net<br>Exports<br>(MMTCE) | Net<br>Transfers<br>(millions \$1997) |
|---------|-----------------------------------------|---------------------------------------|----------------------------------|---------------------------|---------------------------------------|
| US      | 23.18                                   | 12166.23                              | 145.53                           | -454.47                   | 10533.60                              |
| Japan   | 23.18                                   | 2486.46                               | 11.26                            | -101.74                   | 2358.04                               |
| Canada  | 23.18                                   | 1348.97                               | 7.44                             | -54.56                    | 1264.66                               |
| FSU     | 23.18                                   | -8541.34                              | 97.86                            | 415.86                    | -9638.69                              |
| W. Eur  | 23.18                                   | 5880.38                               | 45.81                            | -231.19                   | 5358.56                               |
| Austrl  | 23.18                                   | 413.89                                | 6.12                             | -14.88                    | 344.89                                |
| E. Eur  | 23.18                                   | -2668.03                              | 14.18                            | 122.18                    | -2831.76                              |
| China   | 23.18                                   | -3256.59                              | 260.10                           | 260.10                    | -6028.56                              |
| India   | 23.18                                   | -456.05                               | 37.58                            | 37.58                     | -871.10                               |
| Korea   | 23.18                                   | -34.23                                | 2.88                             | 2.88                      | -66.85                                |
| Mexico  | 23.18                                   | -219.87                               | 18.24                            | 18.24                     | -422.81                               |
| ROW     | 0.00                                    | 0.00                                  | 0.00                             | 0.00                      | 0.00                                  |

CDM adaptation fund (in millions of 1997\$) = 0.00000000

~~~~~  
 CONSTRAINED TRADING/CDM RESULTS  
 ~~~~~

JOINT CAP ON UMBRELLA AND CDM PURCHASES:

Traders can buy Umbrella and CDM tons up to amount allowed by EU formula.

SALES CONSTRAINT ON UMBRELLA COUNTRIES:

Traders can sell no hot air.

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 EU FORMULA BUYING CAPS  
 ~~~~~

| Country | EU base<br>buying cap<br>(MMTCE) | Real reductions<br>above buying cap<br>(MMTCE) | Total EU<br>buying cap<br>(MMTCE) |
|---------|----------------------------------|------------------------------------------------|-----------------------------------|
| US      | 203                              | 97                                             | 301                               |
| Japan   | 37                               | 19                                             | 57                                |
| Canada  | 20                               | 11                                             | 31                                |
| FSU     | 66                               | 65                                             | 132                               |
| W. Eur  | 99                               | 39                                             | 139                               |
| Austrl  | 5                                | 5                                              | 11                                |
| E. Eur  | 26                               | 0                                              | 26                                |
| China   | 0                                | 313                                            | 313                               |
| India   | 0                                | 47                                             | 47                                |
| Korea   | 0                                | 4                                              | 4                                 |
| Mexico  | 0                                | 23                                             | 23                                |
| ROW     | 0                                | 0                                              | 10000000000000000                 |

**EUROPEAN UNION  
DELEGATION OF THE EUROPEAN COMMISSION**

2300 M Street, NW Washington, DC 20037, U.S.A.  
telephone: 202-862-9500 fax: 202-429-1766

Fax No: 3 440  
Date: May 18, 1999  
Cover plus 7 page(s)  
Chrono:

|                                                                                    |                               |
|------------------------------------------------------------------------------------|-------------------------------|
| <b>to:</b> Mr. Raymond Guiteras<br>Council of Economic Advisers<br>The White House | <b>from:</b> Anders C. Jessen |
| <b>fax:</b> 395-6809                                                               | <b>ext:</b> 9570              |
| <b>subject:</b> Community strategy on climate change – Council conclusions         |                               |

Ref:

**Message:** Attached please find a copy of the Council Conclusions On A Community Strategy On Climate Change as adopted yesterday.



Hugo Paemen  
Head of Delegation

Joe - may help for your article  
RB

**DRAFT**  
**COUNCIL CONCLUSIONS ON A COMMUNITY STRATEGY**  
**ON CLIMATE CHANGE**

1. The Council believes that the Buenos Aires Plan of Action is a satisfactory result of COP4. It includes a programme of work on the further implementation of the Convention, inter alia on further assistance to developing countries through the financial mechanism and the development and transfer of technology, as well as on key issues of the Kyoto Protocol, in particular the Kyoto mechanisms, compliance and policies and measures. The Council believes that urgent preparatory work is needed in order to implement the Buenos Aires Plan of Action by COP6.
2. In this regard, the Council confirms, as a basis for further negotiations at the sessions of SBSTA/SBI from 31 May to 11 June 1999 and thereafter, the additional proposals submitted since COP 4<sup>1</sup> by the European Community and its Member States to the UNFCCC Secretariat. It believes that EC positions on all elements of the Buenos Aires Plan of Action should be further developed, including in particular on the following priorities, with a view to reaching decisions on these matters by COP6:
  - the further elaboration of concrete proposals for principles, rules, modalities and guidelines for the Kyoto mechanisms, which shall include the definition of a concrete ceiling on the use of the Kyoto mechanisms as contained in paragraph 3 below, and which shall be undertaken with priority given to the clean development mechanism (CDM), and
  - the further elaboration of a comprehensive, strong, efficient and effective compliance system.

---

<sup>1</sup> Submissions were put forward on the clean development mechanism (Art. 12), on emission trading (Art. 17) and on joint implementation (Art. 6), on compliance, on activities implemented jointly, on land-use, land-use change and forestry (Articles 3.3 and 3.4 of the Protocol), on the development and transfer of technology, on the implementation of Art. 4.8 and 4.9 of the Convention, on the guidelines for the preparation of national communications and of annual greenhouse gas inventories of Annex I Parties, on methodological issues related to greenhouse gas inventories, on the review process of national communications and greenhouse gas inventories for Annex I Parties, on the consideration of national communications as well as the timing of second national communications of non-Annex I Parties, on education, training and public awareness, and on impacts of single projects.

reaffirms that the provisions in Articles 6, 12 and 17 of the Protocol require that domestic action should provide the main means of meeting the commitments under Article 3 of the Protocol and that a concrete ceiling on the use of the Kyoto mechanisms should be defined.

In the view of the Council a properly defined ceiling will encourage Annex B Parties to develop strong domestic policies and measures in order to modify long term emission trends, the technological structure, especially long-lived infrastructure, and production and consumption patterns. Thereby it will also contribute to preparing the path for more ambitious commitments in the second and subsequent commitment periods. Such a ceiling should also contribute to limiting the displacement of domestic action by "hot air".

The Council recalls that a concrete ceiling on the use of the Kyoto mechanisms should be defined in quantitative and qualitative terms based on equitable criteria. It recognises that there are different ways of approaching the definition of supplementarity, taking into account inter alia the uncertainty that still exists on the structure of the Kyoto mechanisms. In order to provide a basis for further negotiations with other Parties whom we urge to join us in this endeavour, the Council agrees on the following proposal for such a definition :

- a) Net acquisitions by an Annex B Party for all three Kyoto mechanisms together must not exceed the higher of the two following alternatives:

5 % of: its base year emissions multiplied by 5 plus its assigned amount<sup>1</sup>  
2

or

50 % of: the difference between its annual actual emissions in any year of the period from 1994 to 2002, multiplied by 5, and its assigned amount

<sup>1</sup> As defined in Article 3 of the Kyoto Protocol

However, this ceiling on net acquisitions can be increased to the extent that an Annex B Party achieves emission reductions larger than this ceiling in the commitment period through domestic action undertaken after 1993, if demonstrated by the Party in a verifiable manner and subject to the expert review process to be developed under Article 8 of the Kyoto Protocol.

- b) Net transfers by an Annex B Party for all three Kyoto mechanisms together must not exceed:

5 % of: its base year emissions multiplied by 5 plus its assigned amount

2

However, this ceiling on net transfers can be increased to the extent that an Annex B Party achieves emission reductions larger than this ceiling in the commitment period through domestic action undertaken after 1993, if demonstrated by the Party in a verifiable manner and subject to the expert review process to be developed under Article 8 of the Kyoto Protocol.

4. Furthermore, the Council reaffirms the need for an early agreement of the COP on the determination of the part of the emission limitation and reduction commitment under Article 3 that can be met through certified emission reductions accruing from CDM projects in accordance with Article 12.3 (b) of the Kyoto Protocol.
5. The Council believes that, in order to demonstrate progress in the implementation of the commitments of Annex I Parties under the Protocol, in particular by 2005 in accordance with Article 3.2 of the Protocol, Annex I Parties should report on their achievements in the fourth and subsequent national communications using appropriate indicators and benchmarks.

The Council believes that such a set of indicators and benchmarks should be developed taking into account national circumstances and respective capabilities and be included in the guidelines under Articles 7.2/7.4 of the Protocol to be adopted at COP6.

6. The Council recalls that the trading of so-called "hot air" should not lead to overall reductions being lower than would otherwise be the case. This issue may be further addressed through the rules on trading.
7. The Council believes that far greater global limitation and reduction efforts will be necessary in the next decades. Therefore, the Council regrets that no decision concerning the second review of the adequacy of commitments in Article 4.2 (a) and (b) of the Convention could be taken at COP4. Consequently, this issue needs to be resolved at COP5.

In this context, the Council recalls that it is essential to reach agreement on a further refinement of a definition of the ultimate objective of the Convention. The Council recalls its conclusion that global average temperatures should not exceed 2 degrees Celsius above pre-industrial level and that therefore concentration levels lower than 550 ppm CO<sub>2</sub> should guide global limitation and reduction efforts. The question of what additional action is required to meet the ultimate objective also needs to be addressed on the basis of the results of the IPCC Third Assessment Report.

Far greater global limitation and reduction efforts will require increasingly global participation to meet the ultimate objective of the Convention. In this respect, the Council welcomes the steps by developing countries already taken under the Convention to combat climate change and urges them to publicise them further. The national communications of non-Annex I Parties should provide valuable information in this regard. It recognises the wide range of conditions prevailing in developing countries and encourages them to take further steps consistent with their own priorities and needs for sustainable development, making full use of the support offered to them through the financial mechanism of the Convention. The Council welcomes the new opportunities provided through the Global Environment Facility as a result of CoP4, and reaffirms its intention to fully support the Global Environment Facility in its role as the financial mechanism of the Convention.

8. The Council believes that further deepening and broadening of contacts and co-operation with other Parties, especially non-Annex I Parties, will be necessary for a successful implementation of the Buenos Aires Plan of Action, especially on issues related to the Kyoto mechanisms and compliance.

9. The Council believes that reversing emission trends in Annex I countries and the implementation of their Convention commitments are important to further strengthen the role of developing countries in the Convention process. In this regard, the Council believes that Annex I countries should promote an exchange of information on national experiences with respect to the implementation of the Convention commitments and to plans for the implementation of the Protocol. In this context, the Council believes that inter alia the FCCC workshop on the assessment of "best practices" in policies and measures is important. It should also contribute to cooperation between Annex I Parties. The Council also believes that activities in other fora such as ongoing work in the Commission on Sustainable Development (CSD) on energy and sustainable development would further assist the effective implementation of the commitments of all Parties.
10. The Council underlines the importance of an early ratification of the Kyoto Protocol in order to implement as soon as possible the commitments under the Protocol. It is convinced that the early implementation of sound national strategies by the Member States, the further elaboration and implementation of common and co-ordinated policies and measures, as well as progress on the implementation of the Buenos Aires Plan of Action are essential contributions to the ratification process. It requests the Ad hoc Group to consider necessary elements in the preparation for ratification by the Community and its Member States and to report back to the Council in October 1999.
11. The Council recalls the commitments of the European Council to integrate environment and sustainable development into all Community policies in view of the Amsterdam Treaty. The Council believes that the integration of climate change issues into other policies, especially energy, transport, agriculture, development, internal market and industry, as well as early and substantial progress on effective common and co-ordinated policies and measures is of great importance in order to implement the commitments of the European Community and the Member States under the Protocol. In this regard the Council recalls its conclusions of 23 March (Environment), 11 May (Energy), 16/17 June (Environment), 17 June (Joint Environment/Transport), 6 October (Environment), 13 November (Energy), 24/25 November (Agriculture), and 30 November/1 December 1998 (Transport) as well as the Presidency conclusions of the European Council of 11/12 December 1998. It urges the Commission to finalise its report for the Cologne European Council as soon as possible and requests the Commission to take these conclusions into account in preparing its report.

12. The Council notes the work currently under way in the ECOFIN on the Commission's draft Energy Products Directive. The Council is of the opinion that decisions in this context should aim to give incentives to improve energy efficiency, to increase the share of renewable energy, and to reduce carbon dioxide and other greenhouse gas emissions.

The Council further underlines that there can be no environmental justification for a tax exemption for aircraft fuel. The Council requests the Commission to finalise its communication on the impact of aircraft fuel taxation as a matter of urgency in order to allow the Council to decide on this subject. In this context, the Council recalls its conclusions of 23 March and 16/17 June 1998 urging Annex I Parties to pursue work through ICAO to limit or reduce greenhouse gas emissions.

13. The Council reiterates its belief that further common and co-ordinated policies and measures (CCPMs) are essential for the European Community and its Member States to meet the commitments of the Protocol. In this regard the Council reaffirms its conclusions of 16/17 June 1998 and in particular urges the Commission to submit without delay further proposals on common measures in accordance with paragraph 11 of these conclusions. The Council also notes with appreciation the outcome of the Council in its Energy formation on 11 May 1999 including the areas identified for further work inter alia on the following climate-related issues:

- Strategy for giving effect to environmental integration and sustainable development within the area of energy policy,
- Programme for energy efficiency, taking into account the Commission communication on energy efficiency and its intention to prepare an action plan,
- Reduction of "stand-by" losses,
- Programme for renewable energies taking into account the White Paper for Renewable Energies, and
- Access of electricity from renewable energy sources to the internal market.

The Council looks forward to further action on climate-related CCPMs in all the appropriate formations of the Council as requested by the Cardiff and Vienna European Councils.

14. The Council requests the ad hoc Group to continue and further strengthen its work on the above-mentioned items.

**White House Climate Change Task Force**

734 Jackson Place, N.W. • Washington, DC 20503

**FACSIMILE TRANSMISSION SHEET**

|                      |                 |                      |                |
|----------------------|-----------------|----------------------|----------------|
| <b>To</b>            | <i>Joe Aldy</i> | <b>From</b>          | <i>John H.</i> |
| <b>Office</b>        |                 | <b>Date</b>          |                |
| <b>Fax Number</b>    |                 | <b>Fax Number</b>    | 395-2342       |
| <b>Office Number</b> |                 | <b>Office Number</b> | 395-2310       |

**Comments:**

*This is very, very close  
to final - Times made  
a couple of very small changes*

Pages: \_\_\_\_\_, including this cover sheet.

IF TRANSMITTAL IS INCOMPLETE, PLEASE PHONE

**Making Kyoto Work:  
Why Emissions Trading Is Good for the Economy *and* the Environment**  
by Carol Browner & Stuart Eizenstat  
October 1998

On November 2 in Buenos Aires, the parties to last year's Kyoto Protocol on global climate change will gather to pursue the hard work of filling in the blanks to that historic accord. But an ongoing controversy over how to implement critical market-based provisions negotiated last year threatens to disrupt the steady progress that should be our goal.

The Kyoto Protocol sets ambitious targets for developed countries to reduce their greenhouse gas emissions, which most scientists believe are causing higher temperatures and disrupting the world's climate patterns. Preserving a stable and hospitable climate will likely require a sustained commitment to reducing emissions over time. That is why it is so important, right from the start, to focus on how countries can meet their targets at the lowest possible cost.

This critical link between ambitious environmental targets and low-cost implementation was central to the success of the Kyoto negotiations. In the Protocol, the parties agreed that countries may meet their targets through a combination of domestic and international actions, including both domestic and international "emissions trading." Without these options, it simply would not have been possible to take on targets as ambitious as we agreed to in Kyoto.

Unfortunately, many countries and organizations most passionately committed to solving the problem of climate change are, in our view, mistakenly opposed to emissions trading or determined to place counter-productive restrictions on it. If this view succeeds, it will dramatically increase the costs of protecting our environment and imperil many countries' ability to go forward with Kyoto.

Emissions trading is the key to strong targets because it will allow us to make the most greenhouse gas reductions for each available dollar (or each mark, pound, franc, or yen). In the U.S. acid rain emissions trading program, every emitter must have an allowance for each ton of sulfur dioxide that it emits. For some emitters, the cost of cutting a ton of emissions is many times greater than for others. Those who find the cheapest ways to cut emissions are tangibly rewarded, because they can sell any allowance they do not need to others that face higher costs.

The results speak for themselves. U.S. acid rain-causing emissions are being cut ahead of schedule at 50% of the expected cost, bringing cleaner air to millions of Americans. Economists of every stripe agree that the costs of reducing greenhouse gas emissions for *all* countries -- not just the United States -- will be dramatically lower with an efficient trading system. Within the European Community alone, measures to control greenhouse gases are as much as *six times* more expensive in some countries than in others, according to European private sector analysts. The cost differences are even greater when looking at all industrialized countries, and greater still between developed and developing countries. Trading gets the incentives right by encouraging reductions where they can be achieved at the lowest cost.

Of course, emissions trading is not a substitute for an aggressive national commitment to controlling greenhouse gases. Rather, it is just one tool for carrying out such a commitment. The United States has been pursuing nearly 50 programs to reduce our emissions and improve our energy efficiency since 1993, the year after we ratified the original climate change treaty. In October of last year, President Clinton proposed a significantly stepped up effort, including \$6.3 billion over five years in tax incentives and R&D to cut carbon dioxide through increased energy efficiency and renewable energy, and to reduce the other greenhouse gases. In the recently completed budget negotiations, the President secured a 25 percent increase in climate change investments over last year's total. The U.S. plan also includes restructuring of our electricity industry to provide market incentives for renewables and increased efficiency; consultations with industry to develop sector by sector plans to reduce emissions; an aggressive plan to improve the federal government's own use and procurement of energy; and ultimately, after U.S. ratification of the Kyoto Protocol, a greenhouse gas emissions trading program based on our acid rain experience.

We recognize that many people of good intentions have questions about how emissions trading can be made to work internationally. Some are concerned about weaknesses in national and international institutions to measure emissions and ensure compliance. That is why the United States is committed to building an international trading system of the highest integrity, with strong incentives for compliance. In fact, the U.S. is already working with a number of developed and developing countries to help strengthen their capacity to measure emissions and participate in an emissions trading system with high standards.

Others have argued for limits on how much of a nation's Kyoto target can be met through international emissions trading. This is a deeply flawed idea. Limits on trading would greatly increase administrative costs, be exceedingly difficult to implement, and generally make it much more expensive to address climate change. In fact, the adverse impact would be even greater in Europe than in the United States: restrictions currently proposed by some governments could well double carbon allowance prices in the United States and *triple* those allowance prices in the European Union -- without providing any reductions in world-wide greenhouse gas emissions beyond the targets established in Kyoto. Limiting trading will make any given amount of emissions reductions cost more. It makes little sense to waste resources at a time of uncertain growth prospects in the global economy, nor to limit the potential of emissions trading to spur investment and innovation and to expand job opportunities.

\* \* \*

We owe it to future generations to protect them from the damaging effects of climate change. That is why it is vital that Buenos Aires build on the momentum generated at Kyoto. The best way to protect the environment is to provide the right economic incentives and, by so doing, get the fastest, deepest reductions at the lowest possible cost. Let us work together, do this right, and take good care of both the world's environment and its economy.

*This is  
Transfer's  
Assessment*

## Assessment of EU Supplimentarity Provisions<sup>1</sup>

The proposal calls for a restriction on both net acquisitions and net transfers by an Annex B Party for all three of the Kyoto mechanisms (emissions trading, joint implementation, and the clean development mechanism).

### The Formula for Buying

The restriction on net acquisitions boils down to a combination of:

1) the higher of the two following alternatives:

- a) Acquire no more than 5% of the average between base emissions and target emissions<sup>2</sup>; or
- b) Acquire no more than half of the required reductions as of 2002<sup>3</sup>

2) in addition, the proposal allows the ceiling to be increased, based on verified domestic reductions achieved during the commitment period based on measures taken since 1993, for emissions reductions larger than the ceiling. In order to use this provision, such domestic reductions must be demonstrated by the Party in a verifiable manner and subject to the expert review process.

### What the Buying Restriction Means

The **first provision** provides an amount that can be acquired with "no strings attached". That is, no demonstration of domestic reductions is required; the ceiling is calculated using values of actual emissions and the assigned amount as defined by Article 3.

For the U.S., (1b) provides the largest ceiling, estimated to be about 40% of the required gap [difference between projected emissions and assigned amount, assuming current funding of domestic measures under the climate change action plan (CCAP)].

The **second provision** essentially puts a floor on the ceiling so that as long as a Party could demonstrate domestic reductions for at least 50% of its gap, it could acquire 50% of its gap using the

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<sup>1</sup> Based on the May 12, 1999 proposal by the EU Permanent Representatives Committee for adoption by the EU Council on May 17, 1999 as Council Conclusions on a Community Strategy on Climate Change.

<sup>2</sup>  $= 0.05 * [(base\ yr\ emissions * 5) + Assigned\ Amount] / 2$

<sup>3</sup>  $= 0.50 * \{ [(annual\ actual\ emissions\ in\ any\ year\ 1994-2002) * 5] - Assigned\ Amount \}$

Kyoto mechanisms. For some Parties, the combination of provisions would allow acquisition of greater than 50% of their gap, but in no cases would it allow less than 50%, assuming the Party could demonstrate domestic reductions for the remaining 50%.

For the U.S., assuming no reductions prior to 2008, it would essentially mean that we could acquire up to 50% of our gap. (This assumes that we want to just meet our target; it would allow us to acquire even more but only in excess of our gap so that it could be banked.) Using the 40% ceiling calculated for 1b, the second provision could add up to an additional 10% to the ceiling if we demonstrated 50% domestic reductions during the commitment period).

If we include the measures taken since 1993, assuming current funding levels for CCAP are maintained through the commitment period<sup>4</sup>, then the ceiling on acquisitions is increased to approximately 62% [Victoria: replace roughly calculated 62% with:  $\{[.5 * (\text{annual gap} + 483.339 \text{ mmtCO}_2\text{e} - 2 * \text{ceiling}) + \text{ceiling}\}$  as a % of gap].

If we include additional reductions achieved in the U.S. between 2003 and 2008 (beyond CCAP), such as reductions recorded under an early crediting program, the ceiling on U.S. acquisitions would increase above 62% by half of the amount of additional reductions.

### **The Formula for Selling**

The restriction on net transfers essentially prevents a Party from transferring more than 5% of the average between baseline and target emission levels. Similar to the acquisition restriction, the proposal also allows the ceiling to be increased based on verified domestic reductions achieved during the commitment period from actions taken since 1993, for emission reductions larger than the ceiling.

### **What the Selling Restriction Means**

This would mean the Russian Federation and Ukraine each could transfer up to 50% of their assigned amounts (5% with no strings attached and 45% if they demonstrate 50% reductions through domestic action). Note, it would appear that Russia or Ukraine could engage in forward/options transactions with other Parties in order to obtain the capital to invest in "domestic" reductions to demonstrate they achieved domestic reductions on the order of 50% of their assigned amount and thereby increase their ceiling on sales to 50% of their assigned amount.

### **Disadvantages of Proposal**

In addition to the overly complex formulation (including the need for a demonstration of reductions resulting from domestic action and subject to expert review), this proposal has the same disadvantages

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<sup>4</sup> The 1997 Climate Action Report projects the effects of CCAP measures on emissions in the year 2010 to be 131.7 mmtce (483.339 mmtCO<sub>2</sub>e) reduction in emissions.

as other proposals to quantify "supplemental" with a quantitative ceiling on the use of the Kyoto mechanisms.

In addition, although the proposal does provide the positive incentive for early reductions in order to increase the cap using the second provision (which requires verification, review, etc), it also provides the perverse incentive to increase emissions up to 2002 in order to increase the ceiling allowed without verification of domestic reductions. This is because the formula in 1b includes the difference between actual emissions in any year up to 2002 and assigned amount. The higher the amount of emissions in 2002, the higher the difference between actual and assigned amount, and therefore, the higher the ceiling.

### Other Points of Interest

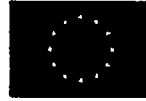
- A. The May 12, 1999 proposal appears to be **stricter** than the March 11, 1999 "last compromise proposal" due to the addition of the language "larger than this ceiling" to the provisions in both the selling and buying formulas which allow for raising the ceiling based on domestic action.

Without the new phrase, a Party could increase their ceiling by half of the remaining gap above the ceiling calculated under provision (1) above. For the U.S., this means that the ceiling of 40% could be increased to 70% of the gap, even if no reductions occurred prior to 2008.

With early reductions, the ceiling could be even higher.

With the new phrase, "larger than this ceiling", my interpretation is that the ceiling could only be raised by domestic reductions over and above domestic reductions equal to the ceiling amount. Therefore the 40% ceiling calculated from (1b) must be matched with 40% domestic reductions before any additional reductions can increase the ceiling. Of the remaining 20%, 10% can be acquired if the other 10% is reduced domestically. This equals a 50% ceiling with the "larger than this ceiling" language.

- B. Footnote 1 of the proposal indicates that the "assigned amount" used in the formulas is "[a]s defined in Article 3 of the Kyoto Protocol." Because there is no reference in Article 3 to the Article 4 reallocations, "assigned amount" could be interpreted to equal 92% of base emissions for all EU countries (rather than their reallocated targets). However, the data that accompany the March 11, 1999 "last compromise proposal" use the reallocated targets for EU countries in calculating what ceiling would apply to them based on the formula.



**EUROPEAN UNION  
THE COUNCIL**

**Brussels, 12 May 1999**

**8226/99**

**LIMITE**

**ENV 166  
ENER 57  
FISC 116  
ONU 6**

**"A" ITEM NOTE**

|           |                                                                     |
|-----------|---------------------------------------------------------------------|
| from :    | Permanent Representatives Committee                                 |
| to :      | Council                                                             |
| Subject : | Community strategy on climate change<br>- draft Council conclusions |

At its meeting on 12 May 1999, the Permanent Representatives Committee agreed to invite the Council

- to adopt, as an "A" item on the Agenda for the Council meeting on 17 May 1999, the Council conclusions on the Community strategy on climate change as reproduced in Annex 1;
- to enter into its minutes the statements contained in Annex 2.

ANNEX 1

DRAFT  
COUNCIL CONCLUSIONS ON A COMMUNITY STRATEGY  
ON CLIMATE CHANGE

1. The Council believes that the Buenos Aires Plan of Action is a satisfactory result of COP4. It includes a programme of work on the further implementation of the Convention, inter alia on further assistance to developing countries through the financial mechanism and the development and transfer of technology, as well as on key issues of the Kyoto Protocol, in particular the Kyoto mechanisms, compliance and policies and measures. The Council believes that urgent preparatory work is needed in order to implement the Buenos Aires Plan of Action by COP6.
2. In this regard, the Council confirms, as a basis for further negotiations at the sessions of SBSTA/SBI from 31 May to 11 June 1999 and thereafter, the additional proposals submitted since COP 4<sup>1</sup> by the European Community and its Member States to the UNFCCC Secretariat. It believes that EC positions on all elements of the Buenos Aires Plan of Action should be further developed, including in particular on the following priorities, with a view to reaching decisions on these matters by COP6:
  - the further elaboration of concrete proposals for principles, rules, modalities and guidelines for the Kyoto mechanisms, which shall include the definition of a concrete ceiling on the use of the Kyoto mechanisms as contained in paragraph 3 below, and which shall be undertaken with priority given to the clean development mechanism (CDM), and

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<sup>1</sup> Submissions were put forward on the clean development mechanism (Art. 12), on emission trading (Art. 17) and on joint implementation (Art. 6), on compliance, on activities implemented jointly, on land-use, land-use change and forestry (Articles 3.3 and 3.4 of the Protocol), on the development and transfer of technology, on the implementation of Art. 4.8 and 4.9 of the Convention, on the guidelines for the preparation of national communications and of annual greenhouse gas inventories of Annex I Parties, on methodological issues related to greenhouse gas inventories, on the review process of national communications and greenhouse gas inventories for Annex I Parties, on the consideration of national communications as well as the timing of second national communications of non-Annex I Parties, on education, training and public awareness, and on impacts of single projects.

- the further elaboration of a comprehensive, strong, efficient and effective compliance system.

3. The Council recalls its conclusions of 23 March, 16/17 June and 6 October 1998 and reaffirms that the provisions in Articles 6, 12 and 17 of the Protocol require that domestic action should provide the main means of meeting the commitments under Article 3 of the Protocol and that a concrete ceiling on the use of the Kyoto mechanisms should be defined.

In the view of the Council a properly defined ceiling will encourage Annex B Parties to develop strong domestic policies and measures in order to modify long term emission trends, the technological structure, especially long-lived infrastructure, and production and consumption patterns. Thereby it will also contribute to preparing the path for more ambitious commitments in the second and subsequent commitment periods. Such a ceiling should also contribute to limiting the displacement of domestic action by "hot air".

4. The Council recalls that a concrete ceiling on the use of the Kyoto mechanisms should be defined in quantitative and qualitative terms based on equitable criteria. It recognises that there are different ways of approaching the definition of supplementarity, taking into account inter alia the uncertainty that still exists on the structure of the Kyoto mechanisms. In order to provide a basis for further negotiations with other Parties whom we urge to join us in this endeavour, the Council agrees on the following proposal for such a definition :

- a) Net acquisitions by an Annex B Party for all three Kyoto mechanisms together must not exceed the higher of the two following alternatives:

5 % of: its base year emissions multiplied by 5 plus its assigned amount<sup>1</sup>  
2

or

50 % of: the difference between its annual actual emissions in any year of the period from 1994 to 2002, multiplied by 5, and its assigned amount

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<sup>1</sup> As defined in Article 3 of the Kyoto Protocol

However, this ceiling on net acquisitions can be increased to the extent that an Annex B Party achieves emission reductions larger than this ceiling in the commitment period through domestic action undertaken after 1993, if demonstrated by the Party in a verifiable manner and subject to the expert review process to be developed under Article 8 of the Kyoto Protocol.

- b) Net transfers by an Annex B Party for all three Kyoto mechanisms together must not exceed:

5 % of: its base year emissions multiplied by 5 plus its assigned amount

2

However, this ceiling on net transfers can be increased to the extent that an Annex B Party achieves emission reductions larger than this ceiling in the commitment period through domestic action undertaken after 1993, if demonstrated by the Party in a verifiable manner and subject to the expert review process to be developed under Article 8 of the Kyoto Protocol.

5. Furthermore, the Council reaffirms the need for an early agreement of the COP on the determination of the part of the emission limitation and reduction commitment under Article 3 that can be met through certified emission reductions accruing from CDM projects in accordance with Article 12.3 (b) of the Kyoto Protocol.
6. The Council believes that, in order to demonstrate progress in the implementation of the commitments of Annex I Parties under the Protocol, in particular by 2005 in accordance with Article 3.2 of the Protocol, Annex I Parties should report on their achievements in the fourth and subsequent national communications using appropriate indicators and benchmarks.
7. The Council believes that such a set of indicators and benchmarks should be developed taking into account national circumstances and respective capabilities and be included in the guidelines under

Articles 7.2/7.4 of the Protocol to be adopted at COP6.

8. The Council recalls that the trading of so-called "hot air" should not lead to overall reductions being lower than would otherwise be the case. This issue may be further addressed through the rules on trading.
9. The Council believes that far greater global limitation and reduction efforts will be necessary in the next decades. Therefore, the Council regrets that no decision concerning the second review of the adequacy of commitments in Article 4.2 (a) and (b) of the Convention could be taken at COP4. Consequently, this issue needs to be resolved at COP5.

In this context, the Council recalls that it is essential to reach agreement on a further refinement of a definition of the ultimate objective of the Convention. The Council recalls its conclusion that global average temperatures should not exceed 2 degrees Celsius above pre-industrial level and that therefore concentration levels lower than 550 ppm CO<sub>2</sub> should guide global limitation and reduction efforts. The question of what additional action is required to meet the ultimate objective also needs to be addressed on the basis of the results of the IPCC Third Assessment Report.

Far greater global limitation and reduction efforts will require increasingly global participation to meet the ultimate objective of the Convention. In this respect, the Council welcomes the steps by developing countries already taken under the Convention to combat climate change and urges them to publicise them further. The national communications of non-Annex I Parties should provide valuable information in this regard. It recognises the wide range of conditions prevailing in developing countries and encourages them to take further steps consistent with their own priorities and needs for sustainable development, making full use of the support offered to them through the financial mechanism of the Convention. The Council welcomes the new opportunities provided through the Global Environment Facility as a result of CoP4, and reaffirms its intention to fully support the Global Environment Facility in its role as the financial mechanism of the Convention.

10. The Council believes that further deepening and broadening of contacts and co-operation with other

Parties, especially non-Annex I Parties, will be necessary for a successful implementation of the Buenos Aires Plan of Action, especially on issues related to the Kyoto mechanisms and compliance.

11. The Council believes that reversing emission trends in Annex I countries and the implementation of their Convention commitments are important to further strengthen the role of developing countries in the Convention process. In this regard, the Council believes that Annex I countries should promote an exchange of information on national experiences with respect to the implementation of the Convention commitments and to plans for the implementation of the Protocol. In this context, the Council believes that inter alia the FCCC workshop on the assessment of "best practices" in policies and measures is important. It should also contribute to cooperation between Annex I Parties. The Council also believes that activities in other fora such as ongoing work in the Commission on Sustainable Development (CSD) on energy and sustainable development would further assist the effective implementation of the commitments of all Parties.
12. The Council underlines the importance of an early ratification of the Kyoto Protocol in order to implement as soon as possible the commitments under the Protocol. It is convinced that the early implementation of sound national strategies by the Member States, the further elaboration and implementation of common and co-ordinated policies and measures, as well as progress on the implementation of the Buenos Aires Plan of Action are essential contributions to the ratification process. It requests the Ad hoc Group to consider necessary elements in the preparation for ratification by the Community and its Member States and to report back to the Council in October 1999.
13. The Council recalls the commitments of the European Council to integrate environment and sustainable development into all Community policies in view of the Amsterdam Treaty. The Council believes that the integration of climate change issues into other policies, especially energy, transport, agriculture, development, internal market and industry, as well as early and substantial progress on effective common and co-ordinated policies and measures is of great importance in order to implement the commitments of the European Community and the Member States under the

Protocol. In this regard the Council recalls its conclusions of 23 March (Environment), 11 May (Energy), 16/17 June (Environment), 17 June (Joint Environment/Transport), 6 October (Environment), 13 November (Energy), 24/25 November (Agriculture), and 30 November/1 December 1998 (Transport) as well as the Presidency conclusions of the European Council of 11/12 December 1998. It urges the Commission to finalise its report for the Cologne European Council as soon as possible and requests the Commission to take these conclusions into account in preparing its report.

14. The Council notes the work currently under way in the ECOFIN on the Commission's draft Energy Products Directive. The Council is of the opinion that decisions in this context should aim to give incentives to improve energy efficiency, to increase the share of renewable energy, and to reduce carbon dioxide and other greenhouse gas emissions.

The Council further underlines that there can be no environmental justification for a tax exemption for aircraft fuel. The Council requests the Commission to finalise its communication on the impact of aircraft fuel taxation as a matter of urgency in order to allow the Council to decide on this subject. In this context, the Council recalls its conclusions of 23 March and 16/17 June 1998 urging Annex I Parties to pursue work through ICAO to limit or reduce greenhouse gas emissions.

15. The Council reiterates its belief that further common and co-ordinated policies and measures (CCPMs) are essential for the European Community and its Member States to meet the commitments of the Protocol. In this regard the Council reaffirms its conclusions of 16/17 June 1998 and in particular urges the Commission to submit without delay further proposals on common measures in accordance with paragraph 11 of these conclusions. The Council also notes with appreciation the outcome of the Council in its Energy formation on 11 May 1999 including the areas identified for further work inter alia on the following climate-related issues:

- Strategy for giving effect to environmental integration and sustainable development within the area of energy policy,

- Programme for energy efficiency, taking into account the Commission communication on energy efficiency and its intention to prepare an action plan,
- Reduction of "stand-by" losses,
- Programme for renewable energies taking into account the White Paper for Renewable Energies, and
- Access of electricity from renewable energy sources to the internal market.

The Council looks forward to further action on climate-related CCPMs in all the appropriate formations of the Council as requested by the Cardiff and Vienna European Councils.

16. The Council requests the ad hoc Group to continue and further strengthen its work on the above-mentioned items.

# Withdrawal/Redaction Marker

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| DOCUMENT NO.<br>AND TYPE | SUBJECT/TITLE                                                        | DATE       | RESTRICTION |
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| 001. fax                 | To Jeff Miotke from Alistair Maclean, re: Supplimentarity (11 pages) | 05/13/1999 | P1/b(1)     |

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Council of Economic Advisers  
Subject Files  
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### FOLDER TITLE:

GCC [Global Climate Change] Trading Restrictions [Binder]

2017-1095-F  
bg232

### RESTRICTION CODES

#### Presidential Records Act - [44 U.S.C. 2204(a)]

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- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
- P4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
- P5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
- P6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

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- b(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

**U.S. DEPARTMENT OF STATE  
Office of the Spokesman**

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For Immediate Release

May 17, 1999

**STATEMENT BY JAMES B. FOLEY, DEPUTY SPOKESMAN**

**U.S. Reaction to EU Move to Limit Emissions Trading**

The United States Government is disappointed by today's statement of the European Union seeking to restrict the use of emissions trading under the Kyoto Protocol. Nonetheless, our basic position on such limits remains unchanged: The United States has consistently opposed such restrictions, and will strongly oppose them in future negotiations.

Market mechanisms, such as emissions trading, are essential to dealing with the global problem of climate change in the most cost-effective and environmentally effective manner. In the United States, emissions trading has been used with great success to control acid rain at a fraction of the anticipated cost.

The issue of whether emissions trading should be subjected to a quantitative limit was explicitly and thoroughly debated at Kyoto. The European Union favored quantitative limits at that time but, as part of the complex set of compromises that formed the Protocol, the EU accepted a text that includes no quantitative limit. Thus, this new action by the EU is an attempt to rewrite the Kyoto Protocol.

Moreover, under the terms of the Protocol, European nations have asserted an unlimited capacity to trade emissions rights among themselves under their so-called 'bubble'. In today's statement, the EU proposes to restrict every flexibility mechanism agreed to at Kyoto other than its own.

International emissions trading alone, of course, will not achieve our objectives. The United States is taking vigorous domestic action to reduce greenhouse gas emissions and will continue to do so. But restricting trading simply limits one of the most effective tools in the world's arsenal for combating global warming.



EUROPEAN UNION  
THE COUNCIL

Brussels, 12 May 1999

8226/99

LIMITE

ENV 166  
ENER 57  
FISC 116  
ONU 6

**"A" ITEM NOTE**

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from : Permanent Representatives Committee

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to : Council

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Subject : Community strategy on climate change  
- draft Council conclusions

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At its meeting on 12 May 1999, the Permanent Representatives Committee agreed to invite the Council

- to adopt, as an "A" item on the Agenda for the Council meeting on 17 May 1999, the Council conclusions on the Community strategy on climate change as reproduced in Annex 1;
- to enter into its minutes the statements contained in Annex 2.

ANNEX 1

DRAFT  
COUNCIL CONCLUSIONS ON A COMMUNITY STRATEGY  
ON CLIMATE CHANGE

1. The Council believes that the Buenos Aires Plan of Action is a satisfactory result of COP4. It includes a programme of work on the further implementation of the Convention, inter alia on further assistance to developing countries through the financial mechanism and the development and transfer of technology, as well as on key issues of the Kyoto Protocol, in particular the Kyoto mechanisms, compliance and policies and measures. The Council believes that urgent preparatory work is needed in order to implement the Buenos Aires Plan of Action by COP6.
2. In this regard, the Council confirms, as a basis for further negotiations at the sessions of SBSTA/SBI from 31 May to 11 June 1999 and thereafter, the additional proposals submitted since COP 4<sup>1</sup> by the European Community and its Member States to the UNFCCC Secretariat. It believes that EC positions on all elements of the Buenos Aires Plan of Action should be further developed, including in particular on the following priorities, with a view to reaching decisions on these matters by COP6:
  - the further elaboration of concrete proposals for principles, rules, modalities and guidelines for the Kyoto mechanisms, which shall include the definition of a concrete ceiling on the use of the Kyoto mechanisms as contained in paragraph 3 below, and which shall be undertaken with priority given to the clean development mechanism (CDM), and

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<sup>1</sup> Submissions were put forward on the clean development mechanism (Art. 12), on emission trading (Art. 17) and on joint implementation (Art. 6), on compliance, on activities implemented jointly, on land-use, land-use change and forestry (Articles 3.3 and 3.4 of the Protocol), on the development and transfer of technology, on the implementation of Art. 4.8 and 4.9 of the Convention, on the guidelines for the preparation of national communications and of annual greenhouse gas inventories of Annex I Parties, on methodological issues related to greenhouse gas inventories, on the review process of national communications and greenhouse gas inventories for Annex I Parties, on the consideration of national communications as well as the timing of second national communications of non-Annex I Parties, on education, training and public awareness, and on impacts of single projects.

- the further elaboration of a comprehensive, strong, efficient and effective compliance system.

3. The Council recalls its conclusions of 23 March, 16/17 June and 6 October 1998 and reaffirms that the provisions in Articles 6, 12 and 17 of the Protocol require that domestic action should provide the main means of meeting the commitments under Article 3 of the Protocol and that a concrete ceiling on the use of the Kyoto mechanisms should be defined.

In the view of the Council a properly defined ceiling will encourage Annex B Parties to develop strong domestic policies and measures in order to modify long term emission trends, the technological structure, especially long-lived infrastructure, and production and consumption patterns. Thereby it will also contribute to preparing the path for more ambitious commitments in the second and subsequent commitment periods. Such a ceiling should also contribute to limiting the displacement of domestic action by "hot air".

4. The Council recalls that a concrete ceiling on the use of the Kyoto mechanisms should be defined in quantitative and qualitative terms based on equitable criteria. It recognises that there are different ways of approaching the definition of supplementarity, taking into account inter alia the uncertainty that still exists on the structure of the Kyoto mechanisms. In order to provide a basis for further negotiations with other Parties whom we urge to join us in this endeavour, the Council agrees on the following proposal for such a definition :

- a) Net acquisitions by an Annex B Party for all three Kyoto mechanisms together must not exceed the higher of the two following alternatives:

5 % of:  $\frac{\text{its base year emissions multiplied by 5 plus its assigned amount}^1}{2}$

or

50 % of: the difference between its annual actual emissions in any year of the period from 1994 to 2002, multiplied by 5, and its assigned amount

<sup>1</sup> As defined in Article 3 of the Kyoto Protocol

However, this ceiling on net acquisitions can be increased to the extent that an Annex B Party achieves emission reductions larger than this ceiling in the commitment period through domestic action undertaken after 1993, if demonstrated by the Party in a verifiable manner and subject to the expert review process to be developed under Article 8 of the Kyoto Protocol.

- b) Net transfers by an Annex B Party for all three Kyoto mechanisms together must not exceed:

5 % of: its base year emissions multiplied by 5 plus its assigned amount

2

However, this ceiling on net transfers can be increased to the extent that an Annex B Party achieves emission reductions larger than this ceiling in the commitment period through domestic action undertaken after 1993, if demonstrated by the Party in a verifiable manner and subject to the expert review process to be developed under Article 8 of the Kyoto Protocol.

5. Furthermore, the Council reaffirms the need for an early agreement of the COP on the determination of the part of the emission limitation and reduction commitment under Article 3 that can be met through certified emission reductions accruing from CDM projects in accordance with Article 12.3 (b) of the Kyoto Protocol.
6. The Council believes that, in order to demonstrate progress in the implementation of the commitments of Annex I Parties under the Protocol, in particular by 2005 in accordance with Article 3.2 of the Protocol, Annex I Parties should report on their achievements in the fourth and subsequent national communications using appropriate indicators and benchmarks.
7. The Council believes that such a set of indicators and benchmarks should be developed taking into account national circumstances and respective capabilities and be included in the guidelines under

Articles 7.2/7.4 of the Protocol to be adopted at COP6.

8. The Council recalls that the trading of so-called "hot air" should not lead to overall reductions being lower than would otherwise be the case. This issue may be further addressed through the rules on trading.
9. The Council believes that far greater global limitation and reduction efforts will be necessary in the next decades. Therefore, the Council regrets that no decision concerning the second review of the adequacy of commitments in Article 4.2 (a) and (b) of the Convention could be taken at COP4. Consequently, this issue needs to be resolved at COP5.

In this context, the Council recalls that it is essential to reach agreement on a further refinement of a definition of the ultimate objective of the Convention. The Council recalls its conclusion that global average temperatures should not exceed 2 degrees Celsius above pre-industrial level and that therefore concentration levels lower than 550 ppm CO<sub>2</sub> should guide global limitation and reduction efforts. The question of what additional action is required to meet the ultimate objective also needs to be addressed on the basis of the results of the IPCC Third Assessment Report.

Far greater global limitation and reduction efforts will require increasingly global participation to meet the ultimate objective of the Convention. In this respect, the Council welcomes the steps by developing countries already taken under the Convention to combat climate change and urges them to publicise them further. The national communications of non-Annex I Parties should provide valuable information in this regard. It recognises the wide range of conditions prevailing in developing countries and encourages them to take further steps consistent with their own priorities and needs for sustainable development, making full use of the support offered to them through the financial mechanism of the Convention. The Council welcomes the new opportunities provided through the Global Environment Facility as a result of CoP4, and reaffirms its intention to fully support the Global Environment Facility in its role as the financial mechanism of the Convention.

10. The Council believes that further deepening and broadening of contacts and co-operation with other

Parties, especially non-Annex I Parties, will be necessary for a successful implementation of the Buenos Aires Plan of Action, especially on issues related to the Kyoto mechanisms and compliance.

11. The Council believes that reversing emission trends in Annex I countries and the implementation of their Convention commitments are important to further strengthen the role of developing countries in the Convention process. In this regard, the Council believes that Annex I countries should promote an exchange of information on national experiences with respect to the implementation of the Convention commitments and to plans for the implementation of the Protocol. In this context, the Council believes that inter alia the FCCC workshop on the assessment of "best practices" in policies and measures is important. It should also contribute to cooperation between Annex I Parties. The Council also believes that activities in other fora such as ongoing work in the Commission on Sustainable Development (CSD) on energy and sustainable development would further assist the effective implementation of the commitments of all Parties.

12. The Council underlines the importance of an early ratification of the Kyoto Protocol in order to implement as soon as possible the commitments under the Protocol. It is convinced that the early implementation of sound national strategies by the Member States, the further elaboration and implementation of common and co-ordinated policies and measures, as well as progress on the implementation of the Buenos Aires Plan of Action are essential contributions to the ratification process. It requests the Ad hoc Group to consider necessary elements in the preparation for ratification by the Community and its Member States and to report back to the Council in October 1999.

13. The Council recalls the commitments of the European Council to integrate environment and sustainable development into all Community policies in view of the Amsterdam Treaty. The Council believes that the integration of climate change issues into other policies, especially energy, transport, agriculture, development, internal market and industry, as well as early and substantial progress on effective common and co-ordinated policies and measures is of great importance in order to implement the commitments of the European Community and the Member States under the

Protocol. In this regard the Council recalls its conclusions of 23 March (Environment), 11 May (Energy), 16/17 June (Environment), 17 June (Joint Environment/Transport), 6 October (Environment), 13 November (Energy), 24/25 November (Agriculture), and 30 November/1 December 1998 (Transport) as well as the Presidency conclusions of the European Council of 11/12 December 1998. It urges the Commission to finalise its report for the Cologne European Council as soon as possible and requests the Commission to take these conclusions into account in preparing its report.

14. The Council notes the work currently under way in the ECOFIN on the Commission's draft Energy Products Directive. The Council is of the opinion that decisions in this context should aim to give incentives to improve energy efficiency, to increase the share of renewable energy, and to reduce carbon dioxide and other greenhouse gas emissions.

The Council further underlines that there can be no environmental justification for a tax exemption for aircraft fuel. The Council requests the Commission to finalise its communication on the impact of aircraft fuel taxation as a matter of urgency in order to allow the Council to decide on this subject. In this context, the Council recalls its conclusions of 23 March and 16/17 June 1998 urging Annex I Parties to pursue work through ICAO to limit or reduce greenhouse gas emissions.

15. The Council reiterates its belief that further common and co-ordinated policies and measures (CCPMs) are essential for the European Community and its Member States to meet the commitments of the Protocol. In this regard the Council reaffirms its conclusions of 16/17 June 1998 and in particular urges the Commission to submit without delay further proposals on common measures in accordance with paragraph 11 of these conclusions. The Council also notes with appreciation the outcome of the Council in its Energy formation on 11 May 1999 including the areas identified for further work inter alia on the following climate-related issues:

- Strategy for giving effect to environmental integration and sustainable development within the area of energy policy,

- Programme for energy efficiency, taking into account the Commission communication on energy efficiency and its intention to prepare an action plan,
- Reduction of "stand-by" losses,
- Programme for renewable energies taking into account the White Paper for Renewable Energies, and
- Access of electricity from renewable energy sources to the internal market.

The Council looks forward to further action on climate-related CCPMs in all the appropriate formations of the Council as requested by the Cardiff and Vienna European Councils.

16. The Council requests the ad hoc Group to continue and further strengthen its work on the above-mentioned items.

SG

Embassy of the United States of America  
Office of Global Affairs  
Deichmanns Aue 29  
53170 Bonn  
Federal Republic of Germany

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FAX

Date: 7 October 1998, 0715 EST

To: A A/S Melinda Kimble      WITH COPY      Ambassador Mark Hambley  
fax - 7-0217      TO      fax - 7-0217

Dan Reifsnnyder      → pass to      Jonathan Pershing  
fax 7-0191      same

Subject: EU Decision on Concrete Caps (Message from Rafe)

A/S Kimble, Ambassador Hambley, Dan, Jonathan,

Rafe left here about an hour ago after a meeting with A/S Manfred Plaetrich at the Environment Ministry. We obtained a copy of the EU climate change policy paper from yesterday's meeting in Luxembourg which is attached (if you don't already have one). Rafe was pretty much floored by the paper's bottom line recommendation (for quantitative and qualitative caps) and tried to give a restrained first reaction to the Germans. He will call in first thing in the morning your time (between 8:30 and 10:00 AM EST) to discuss this as well as the link between a caps decision and the increasingly likely German decision to shut-down nuclear facilities. (Nuclear power from 16 plants makes up about 32-33 percent of the mix here in Germany. We met with Greens and SPD staffers yesterday and talked details.) He has also asked that we try to get a specific talking point in the President's background material for tomorrow's Shroeder meeting. I have some text but he asked me not to fax it. I will try to get in touch with Ambassador Hambley at OOB to share it (as Rafe asked me to do). If anyone has any questions, please call me! Thanks.....

*Betsy*

Number of pages: 6  
(including cover)

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SN/109/98

OR.EN

MEETING DOCUMENT

Subject: Community strategy on Climate Change  
- Conclusions as adopted by the Council  
(doc. 11439/98)

1. The Council stresses that the European Community and its Member States are committed to making substantial progress on outstanding issues both under the Convention and under the Kyoto Protocol at the Fourth Conference of the Parties (CoP4) to the Framework Convention on Climate Change (UNFCCC) taking place in Buenos Aires in November 1998 in order to keep up the momentum of Kyoto.
2. The Council believes that in order to facilitate further this work, the CoP4 has to adopt a decision on a detailed action plan for the future work of Subsidiary Bodies including
  - ✓ - key issues and specific timetables for the further development of the mechanisms provided for in Articles 6, 12 and 17 of the Kyoto Protocol;
  - specific ways to facilitate co-operation and coordination amongst Annex I Parties with regard to the implementation of policies and measures under Article 2 in order to achieve the targets of the Kyoto Protocol (for instance through a Working Group). In certain fields international discussions have progressed sufficiently far for it to be conceivable in the fairly near future that some elements of coordinated policies and measures could be derived from these discussions;
  - the development of guidelines on
    - ✓ = national inventory systems under Article 5
    - = information required under Article 7
    - = the review of implementation under Article 8 and;
  - the development of procedures and mechanisms to determine and address cases of non-compliance with the provisions of the Protocol.

To this end, the Council sees the need to further strengthen the co-operation with other Parties in the elaboration and implementation of the Protocol, with a view to reaching agreement on as many operational issues and principles as possible at CoP4.

3. The Council reaffirms that developed countries have to take the lead in combating climate change. The Council further reaffirms that the commitments in Article 4.2 (a) and (b) of the Convention are not adequate to meet the ultimate objective of the Convention. The second review of the adequacy of commitments should therefore address the question of what additional action would be needed to meet the objective of the Convention and the information necessary to answer that question. This should include: an examination of the obligations of the Parties to the Convention, as required by Article 7.2 including assessment of the capacity of Parties to meet those obligations; the scope for the obligations of some or all Parties to be strengthened, including by the assumption of limitation or reduction targets; adoption of policies and measures and ways and means of assisting Non-Annex I Parties through bilateral and multilateral channels in the fulfilment of such obligations.
4. The Council recalls its views on principles for the flexible mechanisms, as already expressed in previous Council Conclusions, and in particular in its Conclusions of 23 March 1998 and 17 June 1998. It is the aim of the Council that only Parties bound by a compliance regime shall make use of these mechanisms. The Council confirms, as a basis for further negotiations on the mechanisms provided for in Articles 6, 12 and 17 of the Protocol, the positions on International Emissions Trading, Joint Implementation and the Clean Development Mechanism which have been elaborated by the European Community and its Member States jointly with Candidate Countries, Switzerland and Croatia, and which have been submitted to the UNFCCC Secretariat. The Council stresses the importance of intensifying the dialogue with these and other Parties on the development of the flexible mechanisms as well as on policies and measures for the implementation of the Protocol.
5. The Council agrees on the need to elaborate modalities and procedures for CDM which fully recognise the innovative character of the mechanism, in particular with regard to technology co-operation, taking into account the aims of CDM as defined in Article 12.2 of the Protocol. On the basis of the above-mentioned position the European Community and its Member States will actively consult with other Parties in order to achieve this objective. In accordance with Article 12.3 (b) only a part of emission limitation and reduction commitments under Article 3

can be met through certified emission reductions accruing from CDM projects. This provision is necessary because emission reductions achieved under the CDM lead to an expansion of the overall assigned amount of Annex I Parties. The part shall be determined in a way which ensures that Annex I Parties overall still achieve a significant reduction in their emissions domestically. The Council reaffirms that an early agreement is needed in this regard.

6. The Council reaffirms that the flexible mechanisms defined in the Kyoto Protocol are supplemental to domestic action, which should provide the main means for meeting the commitments under Article 3 of the Protocol. The principles, modalities, rules and guidelines for the operation of the mechanisms have to ensure that they do not undermine domestic action or weaken these commitments. In this context, the Council also recalls that a concrete ceiling on the use of flexible mechanisms has to be defined to achieve these aims.

It should be defined in quantitative and qualitative terms based on equitable criteria.

The Council believes that the discussion between all Parties on the practical elaboration of the supplementarity principle has effectively to start at CoP-4. This elaboration needs to constitute an essential element of the work plan to be adopted at Buenos Aires. The Council urges all Parties to co-operate with a view to reaching final agreement on this issue at CoP-5. The Council requests the Ad Hoc Group on Climate Change to continue its work and report back to Council with a proposal for such a definition as a matter of urgency after CoP-4.

7. The Council stresses the importance of a comprehensive compliance regime covering all issues under the Protocol, including compliance regarding flexible mechanisms, and ensuring regular reporting by the Parties as a prerequisite for assessing compliance with the provisions of the Protocol. Procedures and mechanisms to address cases of non-compliance, including binding consequences, should have regard to the proportionality of consequences and the establishment of a due process. Work on the development of such a regime should start at CoP 4 as a matter of urgency.

8. There are considerable issues of complexity involved in the inclusion of sinks such as links with biodiversity, forest and desertification issues, consistency with sustainable development and the verification and certification of reductions from sequestration activities. The Council supports the conclusions adopted by SBSTA at its eighth session and recalls that the methodological work and in particular the Special Report of the IPCC is a necessary basis for decisions of the Conference of the Parties serving as the meeting of the Parties to the Protocol on issues related to Article 3.3 or to Article 3.4 of the Kyoto Protocol.

9. The Council emphasizes the importance of making early and substantial progress in implementing effective common and co-ordinated policies and measures (CCPMs), including consideration of the potential of measures for effective internalization of external environmental costs, within the Community as already expressed in previous Council Conclusions and in particular in its Conclusions of 23 March 1998, 11 May 1998 and 17 June 1998. In this context the Council takes note of the Presidency Conclusions at the European Council in Cardiff inviting all relevant formations of the Council to establish their own strategies for giving effect to environmental integration and sustainable development within their respective policy areas. Climate Change was identified as one of the areas where integration is necessary in order to achieve this objective. The Council recalls the Conclusions of the European Council that the "Transport", "Energy" and "Agriculture" Councils are invited to start this process. In the preparations of these Councils central attention should be given to the climate issue; the sectoral reports on integration of environmental aspects for the European Council in Vienna should identify effective policies and measures in order to contribute to the fulfilment of the Kyoto commitments, thus enabling the European Council to take stock of progress.

Progress should be reported to the European Council as an important example of environmental integration.

10. The Council asks the Commission :

- to indicate how Community budgets, programmes and funds can be better geared towards measures to support meeting the Kyoto commitments of the European Community and its Member States;
- to indicate how EC ODA funds might better serve the objective of the UNFCCC, noting that these funds should not be used to finance the acquisition of certified emission reduction units;
- to consider the implications of EC rules on state aid on the use of the flexible mechanisms by the Member States.

DRAFT STATEMENTS TO BE ENTERED INTO THE COUNCIL'S MINUTES

Re: para 6

"Italy is of the opinion that the words "the main means" should mean that no less than 50% of the Kyoto target for the European Community and its Member States must be achieved through domestic actions."

Re: para 10, second indent :

"In the absence of a more elaborated assessment and in view of not pre-empting any future discussion, the European Commission reserves its position on the point that ODA funds should not be used to finance the acquisition of certified emissions reduction units.

The Commission also points out that it only disburses around 17% of the total development aid of the European Union."

SN/109/98  
DG I

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MEMBER

EXECUTIVE OFFICE OF THE PRESIDENT  
COUNCIL OF ECONOMIC ADVISERS  
WASHINGTON, D.C. 20500

August 25, 1998

cc: 54  
JA  
SF  
QF

MEMORANDUM FOR TODD STERN

FROM: JEFF FRANKEL *JF*  
SUBJECT: (Un)workability and (In)efficiency of Limits on Trading

The Administration has been united and consistent in emphasizing the critical importance of international trading to bring down the costs of meeting the Kyoto targets. We have argued strongly against European proposals to put a limit on trading -- pointing out the loss in efficiency that would result -- and we must continue to do so. But one should not get carried away. Limits on trading are not literally unworkable.

Two memos are attached. The first explains how limits on trading could be implemented if necessary, albeit with an extra layer of complexity -- just so that we understand the issue in our own minds.

The second memo explains, in terms suitable for use with other countries, why limits on trading would be highly distortionary (even if we no longer feel able to assert that they would be literally unworkable).

Attachments

cc: Dave Sandalow, CEQ  
Dave Wilcox, Treas  
Victoria Greenfield, State  
Bob Cumby, Treas

# **1. Limits to Trade Can be Workable, Even Though Undesirable**

Some proposals on international trading would limit the use of flexible mechanisms (particularly international trading of Annex B 'assigned amount units,' but also Joint Implementation, and the Clean Development Mechanism) in meeting obligations under the convention. Such restrictions would add an additional layer of complexity, but are not necessarily fatal to the market.

**Regardless of limits to trade, an institutional framework is required for trading.**

We have consistently emphasized the central role of the private sector in doing the work of Kyoto. Nevertheless, to ensure the proper functioning of the permit market and that we meet our emissions commitments, we recognize the need for monitoring, record keeping, and enforcement by governments, at least at the domestic level.

At the international level, it is not realistic to have the private market undertake trades freely across national borders without government oversight. Nations will need to demonstrate their compliance at the end of the budget period and will be concerned about counterfeiting, balance of payment statistics, and so on. Therefore, at a minimum, there will need to be a national registry of all international permit trades.

**The added burden of implementing limits to trade would not be insurmountable.**

Essentially, domestic permits would need to be traded for foreign permits at an "exchange rate" which reflected the added constraint of only being able to import or export a set quantity of permits. There are a number of ways to implement a limit, but the simplest might be for the government to issue "right-to-import" or "right-to-export" certificates up to the limit. If, for example, international purchases were recorded at the national trading registry, then the buyer would have to present one right-to-import certificate along with a foreign permit for it to be officially accepted. (They would be "net import" certificates: An American who sold a permit net-import certificate, which he would be free either to use or sell.) Similarly, anyone wanting to sell a permit internationally would have to acquire one right-to-export certificate and combine it with one domestic permit in order to export. Arbitrage would equate the price of domestic permits to the international price of permits plus the certificate price. The price of the certificates would fluctuate on the market, depending on how binding the limit is. Their price would be zero -- i.e., the domestic price and foreign price would be the same -- if the constraint were not binding. Similar mechanisms are currently used to implement import and export quotas throughout the world.

## **2. Limits to Trade are Highly Distortionary**

Restrictions on the use of flexible instruments would be highly distortionary, raising the global costs of addressing climate change while not providing any additional environmental protection.

### **Difficulty in Determining a Baseline**

Certain proposals would limit the reductions achieved abroad to a given percentage of total reductions, which requires defining total reductions from some business-as-usual (BAU) baseline. However, there is no internationally agreed methodology for forecasting emissions, and therefore international negotiations to determine such baselines are likely to be quite complicated. Of course, trading restrictions based on tons, instead of a percentage of BAU, would avoid this problem. In this case, the tonnage restriction for each country would have to be set, creating its own challenge for international negotiations.

### **Interference with the Clean Development Mechanism**

According to the Kyoto Protocol, credits from CDM projects undertaken between 2000 and 2008 can be applied during the commitment period -- providing strong incentive for such investment. Restrictions on the share of reductions from flexible mechanisms could easily interfere with this incentive. Without knowing how reductions in 2008-2012 will be achieved, firms receiving credits now will not know whether those credits will ultimately be applicable to Annex I commitments or not. In other words, they will not know the potential value of their credits, increasing the uncertainty of their investments.

### **Increased Administrative Complexity**

Restrictions will lead to requirements that both sellers and buyers have to report transactions, and to the development of mechanisms to ensure that parties stay within their limits. This will add an additional layer of transaction costs and administrative burden on the system. This creates an artificial market barrier that the new market will have to overcome, decreasing its efficiency.

## Increased Costs of Meeting Commitments

Limits are distortionary. They would create differences in permit prices across countries (a foreign permit would trade at a premium to domestic permits), leading to a situation where countries pay a needlessly high price to achieve the same level of global emissions. Modelers have estimated the efficiency cost of placing limits on global trading:

Permit Prices for a Competitive Market of Annex I and Key Developing Countries

| Country/Region | Domestic Permit Price<br>When There Is No Trading<br>Constraint | Domestic Permit Price<br>When 50% of Reductions<br>Must Occur at Home |
|----------------|-----------------------------------------------------------------|-----------------------------------------------------------------------|
| United States  | \$23/ton                                                        | \$59/ton <sup>1</sup>                                                 |
| European Union | \$23/ton                                                        | \$79/ton                                                              |
| Australia      | \$23/ton                                                        | \$44/ton                                                              |
| Japan          | \$23/ton                                                        | \$158/ton                                                             |
| Canada         | \$23/ton                                                        | \$132/ton                                                             |

Source: SGM

<sup>1</sup> We suppose that this price is higher than the domestic political process is likely to accept.

## Impaired Compliance

In a world without effective international trading, a country that is substantially over its target in 2007 might figure that compliance is hopeless, because it is physically impossible to reduce emissions in so short a span of time. But in a world with effective international trading, a country has no defense against the charge that it can always buy its way out of a shortfall. Because compliance is physically possible in such a world, countries will take the agreement more seriously, and will take correspondingly serious actions.