

**Memorandum to:**

**The Environmental Audit Committee  
House of Commons**

**The international challenge of Climate Change:  
UK leadership in the G8 and EU**

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**Steve Rayner  
James Martin Professor of Science and Civilization  
Director, James Martin Institute  
University of Oxford**

## **The Author**

Steve Rayner is James Martin Professor of Science and Civilization and Director of the James Martin Institute at the University of Oxford. He is a member of the Royal Commission on Environmental Pollution, a Lead Author on Working Group III of the Intergovernmental Panel on Climate Change, and also serves as Director of the Economic and Social Research Council's Science and Society Research Programme.

Rayner spent two decades working in leading research institutions in the United States, much of which was devoted to research on the human dimensions of global environmental change with a particular emphasis on climate. He is co-editor of an extensive review of social science research on climate change, the four volumes of *Human Choice and Climate Change* (Battelle Press 1998). He is also co-author of the book *Making Markets*. He has led the writing of various reports to the Congress of the United States on climate policy instruments and has presented testimony to the US Congress on climate research policy.

He writes here in a personal capacity.

## **The international challenge of Climate Change: UK leadership in the G8 and EU**

This memorandum to the Environmental Audit Committee of the House of Commons consists of two parts, broadly following the structure of questions accompanying the committee's invitation to submit my views. The first section addresses the general strategic questions about what the UK climate change priorities should be during its presidency of the EU and G8. Part II addresses some of the issues facing the global emissions trading system envisaged in the architecture of the Kyoto Protocol and briefly reviews alternatives to such a system.

### **Part I: General strategic questions**

**What priorities on climate change should the UK pursue prior to and during its presidencies of the EU and G8 in 2005? To what extent should the primary focus be on a post-Kyoto framework? Are there any other short or medium term issues that should be part of the UK agenda? If so what?**

*The UK presidency of the EU and G8 presents an important opportunity to move on from the current emphasis on the Kyoto mechanisms and to develop other strategies to deal with both the causes and impacts of climate change that are capable of engaging critical actors in the United States.*

**The Kyoto Protocol was an agreement of historic proportions**, signalling that governments around the world were ready to take climate change seriously. However, **it is also an intrinsically problematic mechanism** for bringing about the kinds of changes in the global energy system that will be required to stabilize anthropogenic greenhouse gas concentrations over the course of the next century and to protect vulnerable human and natural populations from climate change impacts.

Many of these problems were identified even before the protocol was formulated in 1997, but were glossed over in the rush to secure a diplomatic success that has yet to translate into meaningful emissions reductions. As various commentators have observed, the current architecture for an international climate policy regime was based on that achieved for the protection of the stratospheric ozone level. But, despite some obvious superficial parallels, the scientific, technical, and political structure of the ozone and climate problems is quite different. As a consequence **the world has committed itself to a framework for climate policy that, in many respects, may be quite unsuited to the problem.** It seems to be a classic case of the phenomenon observed by military historian Gwynne Dyer, that generals invariably try to fight the next war with the technologies and strategies that won the last one.

However, there is an aspect of the ozone regime that is often overlooked when considering it as a precedent for a climate regime. We should remember that the Montreal Protocol itself was a response to the diplomatic failure to conclude an international ban on CFCs as aerosol propellants under the terms of the earlier Vienna Convention on Protection of the Ozone Layer. Most experts on the ozone regime agree that the much more radical provisions of the Montreal Protocol and succeeding

agreements would not have been achieved so rapidly had the aerosol ban been achieved. **It is conceivable that a more effective regime could emerge from recognizing the failure (or at least, the serious limitations) of the Kyoto Protocol than from its success.**

**No-one suggests that the global emissions reductions envisaged in the Kyoto targets will come anywhere close to limiting emissions at levels that would stabilize anthropogenic greenhouse gas concentrations.** The short-term targets give the appearance of serious action, but gloss over the absence of any viable plans for compliance at these levels, let alone those that would come into force with the inevitable tightening of targets. It has been pointed out that, even if all the current Kyoto commitments were met, it would require some 30 repeat performances to reach this goal. At the current rate of 7-10 years for each phase, we would achieve the goal of atmospheric stabilization in 200-300 years! Clearly this is not an acceptable strategy. We are told that “a journey of a thousand miles begins with a single step” and that targets in future reduction periods will have to be ramped up (always assuming that the first step has in any case taken us in the direction that we wish to go). However, **there has been no serious analysis of the political viability of the kind of radical correction to targets and timetables that would be required for emissions trading to deliver the goods in a more timely fashion.** The recent UK experience of negative reaction to policy-driven increases in petrol prices is not encouraging.

Even the assumption that an inclusive global treaty is required to curb the growth in greenhouse gas emissions may be questionable. **Considering the EU as a single entity, the international political units that really count in terms of emissions controls are fewer than 10.** In addition to the EU these include at least the USA, Russia, China, India, Brazil, and Indonesia. Relying exclusively on an international agreement system that requires the agreement of 185 national governments inevitably results in the very lowest of common denominators.

Of the units that count, the USA remains the largest per capita and total emitter of greenhouse gases. Yet the Kyoto Protocol was dead on arrival at the Clinton White House, as it was abundantly clear that it would never be ratified by a Senate that in 1997 had already voted by 95-0 to reject any treaty that did not require developing country parties to reduce their emissions in the same compliance period. For domestic political reasons, President Clinton chose to keep the corpse on ice in the hope of future resuscitation until President Bush, with an eye to a different political constituency, sent it off for burial. **It is not really conceivable that the USA is going to ratify Kyoto in the foreseeable future, so there is a clear and present need to find alternative means to engage critical actors in the US in efforts to combat climate change.**

There are many opportunities to do this if we are willing to recognize the realities of US political culture. It is encouraging that about **60% of Americans responding to opinion polls have stated that climate change is a significant global problem that requires attention. However, only 40% believes that such action is primarily a matter for the Federal Government.** A continued focus on engaging the US government in the formalities of Kyoto can only continue to distract international efforts from engaging with Americans on levels other than national governments.

Some US State governments are contemplating civil law suits against electric generating companies to recover the costs of adaptation to climate change to which their activities have already contributed. **The threat of civil liability may prove to be a much more powerful incentive to the US electric utility industry to reduce its emissions than the distant threat of incremental Federal regulation.** California is the world's sixth largest economy. **Appliance and vehicle efficiency standards in California become the de facto standards for the entire USA.** Nine Northeast and Mid-Atlantic states are currently putting together their own regional cap-and-trade system to reduce greenhouse gas emissions known as the Regional Greenhouse Gas Initiative (RGGI), raising the possibility that **the US could develop a robust domestic climate policy without the intervention of the Federal Government.**

*Britain could use its leadership of the EU and G8 to encourage regional policy responses outside the Kyoto framework (for example the RGGI) as well as within it (for example the EU emissions trading scheme).*

The various initiatives being developed by the governments of certain US states clearly demonstrate that **national governments are not necessarily the most promising agents for achieving effective climate policy.** It also suggests that **a regional approach to climate change may be a way of building a global climate regime from the bottom up.** One might imagine an Asian climate policy bubble or a Latin-American policy bubble. In every case, the focus should be on progress towards the desired result of stabilizing the concentrations of anthropogenic greenhouse gases in the atmosphere, rather than on fetishizing any particular programme, process, or protocol.

Unfortunately, support for Kyoto has become a litmus test for determining those who take the threat of climate change seriously. Between Kyoto's supporters and those who scoff at the dangers of leaving greenhouse gas emissions unchecked, there has been a tiny minority of commentators and analysts convinced of the urgency of the problem while remaining profoundly sceptical of the proposed solution. But their voices have largely gone unheard. **Climate change policy has become a victim of the sunk costs fallacy. We are told that Kyoto is "the only game in town".** However, it is plausible to argue that implementing Kyoto has distracted attention and effort from real opportunities to reduce greenhouse gas emissions and protect society against climate impacts. While it may not be politically practical or desirable to abandon the Kyoto path altogether, it certainly seems prudent to open up other approaches to achieving global reductions in greenhouse gas emissions. **Britain's leadership of the EU and the G8 is a golden opportunity to establish some new games and open alternative, or at least supplementary, paths to achieve climate policy goals.** Britain, in contrast to the US, has high credibility as a country that has taken the challenge of climate policy seriously. It is therefore well placed to introduce and support much-needed novel approaches and measures into the international arena.

*Policy makers should explore the possibility that international competition could prove to be as important as cooperation in progress towards lowering global carbon emissions.*

The debate about climate change is no longer about whether it is a real scientific issue, but about how society should respond. All available strategies should be

considered. **While cooperation is undoubtedly required at some levels of climate policy, others may be more effectively advanced through competition.** Consider the following scenario. Regardless of Kyoto, the EU as a whole decides to take advantage of the historic opportunity to modernise its energy sector while the US continues along its present path of relying heavily on coal and oil. Initially Europe may experience some loss of competitiveness vis-à-vis the US. However, after a while the modernized EU economy would be likely to outstrip the performance of the aging infrastructure of the US (much as the West German economy did relative to the UK during the post World War II recovery). This would provoke the US to modernise its own energy sector to recover its competitive position with respect to Europe. The result could be a much more rapid reduction in greenhouse gas emissions than would be achieved by endless rounds of tortured negotiations to set targets that will always be the lowest common denominator.

I do not pretend to know the time scale of such a scenario, let alone its probability, although I have canvassed it among various experts on historical technological transformations who assure me that it is quite plausible. It would seem to be quite consistent with the steady 150-year global trend towards decarbonisation of primary energy intensity (from 0.84 tons C per kWyr in 1850 to less than 0.5 tons today.) The point is that it would require cooperation at some levels (in this case, within the EU) while relying on competition at others (between the EU and the USA).

Of course, such a scenario does not depend on the imposition of emissions caps or even explicit emissions targets; rather, it takes advantage of the economic efficiencies that would be achieved through greater energy efficiency. Rather than a restrictive approach towards emissions, it approaches the policy goal indirectly through a positive policy to encourage energy modernization. One thing that social scientists have very hard evidence for is that **the framing of policies fundamentally shapes the choices that people make. A positive approach towards energy modernization is likely to be politically much more attractive (particularly in the US) than one that is framed as a negative policy towards greenhouse gases.** It also asks less from people in terms of behavioural change. Extending initiatives such as the UK's Carbon Trust across the EU could be an important step towards the European action necessary to initiate such a cycle of competitive modernization.

***Regardless of the level of commitment to the Kyoto mechanisms, it is imperative that the EU and G8 countries reverse a decade of precipitous decline in public and private sector investment in energy R&D. Achieving a significant reversal of this trend would be the most significant single action by which the UK could demonstrate international leadership and make an indisputable contribution to any workable strategy to address climate change.***

Since the mid-1980s, the world has enjoyed cheap and abundant fossil energy supplies. Technological advances, discoveries of new petroleum resources, improved energy productivity, and the creation of futures markets, have alleviated fears that the world's energy future would necessarily be characterized by scarcity and high prices. **The widespread perception that energy has become a matter of less urgency, relative to other social priorities, has led to shrinking government budgets for R&D, which have dropped by over 40% worldwide since 1980. The decline has**

**been particularly dramatic in Germany, the UK, and the USA, with the largest hit being taken by the renewables sector.**

At the same time, an ideological shift towards deregulation of the energy sector in many industrialized countries has placed additional pressures on private R&D investments. The introduction of competitive forces has led to shrinking private sector R&D budgets while **remaining private sector resources gravitate more often to lower risk, market-oriented projects than to riskier projects with more distant payoffs.**

This disinvestment in R&D could hardly be happening at a less-opportune time for the pursuit of climate change goals. Much of the electrical generating capacity in the industrialized world is nearing the end of its useful life and will need to be replaced in the next three decades. Europe alone will need to replace over 200,000 Megawatts of capacity by 2020. **Without significant new investment in energy R&D, the technologies upon which any emissions reduction strategy depends simply will not be available at a competitive cost at the time when they could make a significant difference.** It is not that the technologies are missing altogether, but that many of them lack the investment needed to take them to the production levels that would make them economically competitive. Such an investment could, in principle, accelerate the move away from fossil fuels more rapidly than targets and timetables.

It is also worth noting that over 60% of all energy R&D undertaken around the world during the past forty years has been spent on developing nuclear power. This might be part of the solution, at least as an interim stop-gap technology, provided that the nuclear waste issue could be resolved. To achieve public acceptance, this would probably require the establishment of secure, monitorable and retrievable waste storage, the capacity of which would be strictly limited to accommodate only the waste of any licensed new facilities.

Another stop-gap technology is carbon sequestration, which could be used to buy time for an effective transition away from intensive use of fossil carbon for energy. The investments in this sector have been meagre, but the insurance value of such investments could be quite substantial.

A mere 6% of the world's energy R&D budget has been used to support renewable energy. **Since only 10 countries carry out 98% of the world's energy research, a concerted programme of new investment in renewable energy is plausible.** In principle, this could be achieved without any need for international - let alone global - treaties, as the government policies that are needed mainly consist of domestic programmes to induce firms to invest in renewable energy. At a minimum, the Presidency of the EU and G8 could be used to encourage and support such programmes.

**Some limited forms of international agreement would probably be necessary to help transfer advanced, low-emitting technologies to less industrialized countries** so that they can avoid following the carbon intensive development path. However, these arrangements would be far less problematic than full implementation of the Kyoto architecture. Rapid dissemination of advanced technologies is essential. One approach might be to emphasize the world class R&D capabilities of China and,

increasingly, India, so that they could be partners in this process. Such partnerships could also have longer term economic advantages for the UK and EU as these countries rapidly become more developed.

***Policymakers in all countries must recognize that the triggers and motivations for climate policy are inevitably values based and cannot be provided by science.***

The American political scientist, David Victor cogently argues that **caps on emissions only make sense “if the objective of international efforts to slow global warming is to avert a catastrophe that would be triggered by a certain accumulation of emissions in the atmosphere.”** This is exactly the rationale envisaged by the architects of the Framework Convention on Climate Change (FCCC) and the Kyoto Protocol. Emissions would be capped below the trigger point and trading would then provide the most cost-efficient means of staying below the threshold. **However, the problem is how to establish a shared understanding of what that threshold should be.**

To date, the goals of climate policy have, somewhat arbitrarily, focused on preventing atmospheric concentrations of greenhouse gases from rising above 450 to 650 ppm of carbon dioxide equivalent or alternatively above levels that would force a global average temperature increase of 2 degrees C. **However, there is no strong scientific basis for choosing these particular thresholds.** They are certainly not ones associated with any specific sudden dramatic event, such as shutdown of North Atlantic thermohaline circulation or detachment of polar ice sheets. Science cannot, even in principle, provide policy makers with any credible, consistent targets upon which permit allocations, or other policy thresholds can be based. We don't even really know what the actual consequences of carbon stabilization at a given level would be for climate behaviour.

During the summer, the Prime Minister announced his intention to call a scientific conference to determine what level of climate change would be “catastrophic”. **Yet science cannot decide what counts as a catastrophe.** What would be the metric? Today a child dies every eight seconds from waterborne disease. Every 15 seconds an African dies from Malaria. **If these do not represent already catastrophic levels of mortality among the very kinds of populations that will be most vulnerable to the impacts of climate change, it is hard to envisage what levels would be required to provoke action.** Similar points could be raised about the current rate of loss of vulnerable species in marginal ecosystems.

We also know that people in rich countries are willing to live with very high levels of risk (such as earthquakes in California and Japan or hurricanes in the USA), which by any measure must be a much more immediate hazard than climate change risk.

**In the end, climate policy comes down to a question of values – not science.** The decision to proceed with effective climate policies cannot wait for a dramatic precipitating event. In fact, it's hard to visualize what such an event might be. But without one it seems that public pressures on government and private sector decision makers may not be sufficient to get them to take and sustain necessary actions. We also know that the public is more likely to be moved by disaster to support emergency relief than it is to offer sustained support for development assistance. Mobilizing

public values rather than scientific consensus is the key to successful climate action. These may be good reasons to focus more attention than hitherto on adaptation policies that are more directly linked in the public imagination to the consequences of climate change than is the issue of emissions.

*Presidency of the EU and G8 offers an important opportunity to increase policy attention and resources focused on proactive adaptation to climate impacts.*

Until very recently the focus of international negotiations about climate change focused overwhelmingly on emissions mitigation and not very much on issues of climate change impacts and adaptation. Indeed, for the better part of the decade leading up to the turn of the last century, adaptation strategy was virtually a taboo topic in climate policy discourse because of a widespread belief that it would be viewed by many as a way to sidestep the imperative to mitigate. Another reason why adaptation has gotten off to a slower start in international negotiations is that it is even harder to design a universal framework for adaptation (let alone one where compliance is measurable and monitorable) than it is for mitigation.

Adaptation measures avoid climate impacts by changing human behaviours, such as land use, and by taking actions to protect valued resources, communities, and landscapes. Adaptation encompasses a wide range of options that can reduce vulnerability of marginal human and natural populations to the consequences of atmospheric disturbance. Many (although admittedly not all) adaptation measures also offer increased resilience in the face of climatic variability (such as droughts and storms), which makes them potentially attractive policies even in the absence of long-term secular changes in climate.

From the point of view of public policy implementation, adaptation actually may have some advantages over policies directed at mitigation. **Adaptation may be more immediately relevant to stakeholders than emissions mitigation** as it directly addresses people, objects, and landscapes that are known to them and valued by them in their daily lives. Thus adaptation policies may provide opportunities for a wide variety of people to become directly engaged with the climate issue. Also, the basic regulatory and legal concepts and frameworks already exist (eg, governance of land use) and are broadly accepted; they just need to be adapted. This is not to minimize the political challenge, but the point is that you are not starting from scratch. This is in marked contrast with the challenge of mobilizing public support and action to cut emissions. **Emissions are too abstract and too easily seen as someone else's problem to be a good starting point from which to mobilize support for climate policies.** However, once people have mobilized around concrete adaptation goals they may be more likely to recognize the limits of adaptation and move to support for more effective emissions reductions measures than seem plausible at present.

**Domestically, the UK Climate Impacts Programme and various regional initiatives represent an important start in this direction. Government support for these kinds of programmes should be strengthened across all of the governments of the EU and G8.**

Another advantage of increasing the focus on impacts and adaptation is that action on these issues does not require any kind of global consensus. Indeed, as impacts and the

potential for adaptation vary widely on a regional basis, it seems quite likely that such an emphasis would favour regional responses. **There would almost certainly be many and varied opportunities for the articulation of climate policies with other policies designed to improve public health and protect populations from natural disasters.**

*In summary, the UK presidency of the EU and the G8 presents an important opportunity to open up much needed avenues of climate policy that are presently under emphasized. The current overwhelming focus on Kyoto offers only one potential path and, at present, there is no viable alternative or fallback. Even if the Kyoto route is followed to its conclusion, a significant reversal of the last three decades of disinvestment in energy R&D and a much increased focus on adaptation strategies will be required. If Kyoto does not deliver the results desired of it, investments in energy R&D and adaptation will be even more critical.*

## **Part II: Specific problems associated with global emissions trading**

**To what extent does emissions trading offer the best potential for achieving radical reductions in carbon dioxide worldwide? Could other bespoke approaches offer better and more targeted solutions?**

It is often claimed that governments have successfully applied emissions trading in combating acid rain, although even these claims are sometimes disputed. However, basing the expectation that there will be an efficient global market in greenhouse gas emissions on, for example, experience of the US market in sulphur emissions, may be problematic for several reasons.

*First, all existing emissions trading has been within nations where the state has been able to establish and secure property rights.*

But international law cannot compel countries to remain within a treaty and (as indicated by the nuclear non-proliferation regime) sanctions on defectors are generally not effective. As presently constituted, international law is a poor mechanism for allocating permits and controlling a permit market potentially worth trillions of pounds. It is hard to envisage an effective mechanism that would prevent countries from selling their emissions shortfalls until their quotas are used up and then exiting the agreement or forcing the renegotiation of allocations.

This problem is ameliorated where states are closely bound by other constitutional or treaty arrangements, such as the countries of the EU, where withdrawal from the trading system might not be possible due to the wider net of obligations and advantages of membership. At present, the only global candidate for such a role would appear to be the World Trade Organization. Despite the carrot of WTO membership that has been held out to Russia if it should ratify the Kyoto Protocol, the world trade body shows few signs of developing in this direction.

*Second, emissions trading creates new property rights of uncertain value.*

**The fact that property rights in a well-functioning market are more valuable than the annual payments that those rights generate creates huge obstacles to agreeing initial allocations of emissions rights**, as their eventual value is so difficult to determine. This was the problem that held up progress on the UN Convention on the Law of the Sea (UNCLOS) for many years, although seabed-mining rights for manganese nodules had only a hypothetical future value. This creates significant headaches for the international allocation of emissions permits, the value of which are essentially unknown, but potentially very high. Emissions levels for the most important greenhouse gases are inherently unpredictable.

*Third, in the past, national governments establishing trading programmes for environmental management have had to buy off the opposition of affected parties claiming established rights that would be violated unless they are grandfathered in.*

For example, the US government had to make substantial allowances for the existing sulphur emissions of electric power companies in its programme designed to reduce acid rain. Indeed, it was only able to allocate permits at all because of its ability to threaten more costly forms of regulation if the industry did not accept the system – an option unavailable at the international level. In New Zealand, the system of tradable fishing quotas (“TACs”) was only possible because of the substantial grandfathering of established interests within the fishing industry. This may be a necessary concession to set up a programme, indeed substantial new chlorofluorocarbon production capacity in the former Soviet Union was grandfathered under the original terms of the Montreal Protocol.

In constructing an international climate regime, the emissions baselines established for certain countries (notably Russia and the Ukraine) under the Framework Convention on Climate Change were set at levels that they were unlikely to reach, even under optimistic economic scenarios. **The result is a potential for sales of “hot air” (allowances that do not actually represent emissions reductions) to the West in excess of £100 billion. Any serious attempt to develop the Kyoto global trading framework will require that the baselines for Russia and Ukraine be revisited. However, this would drastically reduce the incentive for these countries to participate.**

The problem is exacerbated in any international context where new entrants, ie, **developing countries, will demand allocations that will upset the historically established expectations of the industrialized world.** This is an especially visible issue with respect to the prospects of achieving any sort of US participation in an effective climate policy and was a factor in the Senate’s unopposed resolution not to support any US emissions reduction commitment that was not accompanied by comparable commitments from developing countries.

*Fourth, monitoring compliance may be more problematic than is commonly recognized.*

Monitoring carbon dioxide from fossil fuels is simple in principle, although it must be done indirectly by calculating the emissions implied by combustion of fuels under

certain assumptions of thermodynamic efficiency. However, even approximately accurate calculation of emissions from coal, oil, or gas depends on access to reliable figures for consumption, which only takes account of official production and trading. Although these are generally considered to be tolerably well measured, **there is room for scepticism about the official fossil fuel production figures of many countries that have access to large, but poorly monitored resources.**

The issues of monitoring and enforcement are exacerbated still further by the inclusion of multiple gases and all sources and sinks in the global programme envisioned under the Kyoto protocol. **Biomass burning, tree planting, and carbon released from and sequestered in soils are examples of carbon fluxes that are much harder to measure (or, more accurately, estimate) than fossil fuel emissions.** Once you include sequestration in carbon accounting, the uncertainties and complexities increase with the inevitable result that countries will try and game the system to maximize their claims to be removing carbon dioxide from the atmosphere. This can produce some paradoxical results. For example, at least one study published in *Science* has suggested that the annual emissions of the USA may be carbon neutral due to the rate of reforestation, especially in the Northeast.

Furthermore, the Kyoto Protocol created a basket of six greenhouse gases, each of which has different atmospheric warming characteristics. The accounting device of “global warming potentials” or “CO<sub>2</sub> equivalency” is designed to eliminate this variation; however periodic scientific reassessments of these values and the issue of the dramatically different residence times that the gases will persist in the atmosphere have the potential to destabilize the greenhouse gas accounting system upon which trading will have to be based.

*Fifth, even at a national level, emissions trading has only been implemented for stationary sources, such as electric power plants.*

**A significant proportion of greenhouse gas emissions are from mobile sources and a significant proportion of these are engaged in international travel involving “bunker fuels” which are exempted from domestic taxation.** The Royal Commission on Environmental Pollution and the Environmental Audit Committee have repeatedly highlighted this problem.

*Sixth, the issuance of permits may have implications for the distribution of liabilities.*

The allocation of potential civil liabilities for damages caused by permitted greenhouse gas emissions is an issue has received little attention. Does issuance of emissions permits imply the assumption of liability? In other words, **will governments be held liable in law for damages caused by greenhouse gases emitted by permit holders?** The recent initiation of civil suits against US electric utilities for the costs of rectifying climate impacts from their emissions suggests that climate liabilities may become an issue intertwined with the creation of a system of formally recognized emissions rights.

*Finally, any international system of carbon trading is likely to be only as good as the national systems that compose it. The UK’s experience is not encouraging.*

It seems likely that any such scheme will permit national governments to trade internationally while firms trade within national boundaries. In the case of the EU, the member states propose to establish a European bubble that would allow the EU essentially to function as a single nation for international carbon accounting purposes.

The UK has conducted the world's first experiment in national carbon trading. Defra claims that "31 organisations ('direct participants' in the scheme) have voluntarily taken on emission reduction targets to reduce their emissions against 1998-2000 levels, delivering 11.88 million tonnes of additional carbon dioxide equivalent emission reductions over the life of the scheme (2002 - 2006).... In the first year, the Direct Participants achieved emission reductions of 4.64 million tonnes CO<sub>2</sub>e (carbon dioxide equivalent) against their baselines and in the second year they have achieved emission reductions of nearly 5.2 million tonnes CO<sub>2</sub>e against their baselines." (<http://www.defra.gov.uk/environment/climatechange/trading/uk/index.htm>).

However a careful reading of the UK NAO report on the scheme suggests that it was something less than a resounding success. It actually:

- had considerable difficulty in getting going;
- established very undemanding baselines;
- significantly overpriced the value of reductions purchased (nearly £18 per tonne as against a current market price of £2.50 per tonne);
- only delivered 4 Direct Participants with significant surpluses to trade; and
- only generated trade at 10% of the tradable surplus savings achieved (most of the savings being banked against future emissions).

The government spent £215 million to purchase emissions reductions under the scheme, which does not include the cost of establishing and running it. A well-designed simulation could almost certainly have generated any conceivable social-learning benefits obtained from the scheme at a small fraction of these costs. In short, the very limited domestic experience with greenhouse gas emissions trading is not as encouraging as its designers might have hoped.

Overall, the international prospects for emissions trading seem to depend on the initial target reductions not being sufficiently painful to discourage participation. Even at this level there is likely to be much international wrangling over the fairness of the allocation of permits and commitments. However, **undemanding baselines and initial targets will require severe (ie, expensive) corrections in later phases of both domestic and international trading systems.** This is the particular form that the "ramping up" of Kyoto targets in future commitment periods would take under a trading scenario. The acceptability of such corrections to domestic trading systems will vary tremendously from country to country. Policymakers depending on international trading to deliver a solution that is both environmentally effective and economically efficient are betting that the system will be resilient to both cheating and withdrawal by the time those corrections are required.

*Overall, the inherent problems suggest that it is unlikely that the Kyoto cap-and-trade scheme will result in an economically efficient global market that achieves environmentally effective greenhouse gas emissions reductions.*

**However, this does not mean that trading is entirely useless. It seems that trading may well be a useful policy tool in at least two respects.**

First, where countries are closely bound together by other constitutional or treaty arrangements, such as within the EU, so that the incentives for defection are drastically reduced, **trading may well be a mechanism for drawing attention to climate goals as well as contributing to their fulfilment within such regional groupings.**

Second, any strategy to stabilize greenhouse gas concentrations will require considerable transfers of technology to allow developing countries to leapfrog the carbon intensive development phase experienced by the industrialized (and now post-industrialized) world. **Trading with developing countries may well be a necessary vehicle to convince the domestic populations of the transferring nations that they are getting something in exchange and to discourage a dependency culture among the recipients of such transfers.**

*What are the alternatives to a global cap-and-trade regime?*

At least three alternative architectures to Kyoto have been described by observers who are critical of the cap-and-trade approach. These are:

- carbon taxes
- the “hybrid approach” of tax-and-trade, and
- the “clumsy regime” approach, also described as the “policies-and-measures” approach.

**A coordinated system of carbon taxation, in contrast to emissions trading, sets prices rather than quantities for greenhouse gas emissions.** This is likely to be more economically efficient than a cap-and-trade regime because of the long atmospheric lifetime of carbon dioxide, which requires an inexorable, but non-volatile price signal to bring about the required changes in infrastructure investments. **It could ameliorate the political difficulties of allocating emissions reduction commitments among countries,** because governments would have some discretion to adjust the level of taxation to suit their economies, and **it would avoid creating the potentially huge financial flows that would result from the creation of new property rights under a trading regime.**

However, taxation also has its drawbacks. It is likely to be regressive. It would make the costs of climate policy more transparent and therefore **it would be an easier target for political opposition.** There would inevitably be divisive disagreements about the ways in which the tax revenues were returned to the economy. Like any “sin” tax, **carbon taxation could potentially create a moral hazard for governments** seeking to offset its distorting effects on the economy by lightening other forms of taxation. And, unless it were set at an internationally uniform level (thus eliminating the advantage of government discretion) **it would also have implications for international competitiveness.**

**The “hybrid approach”** proposed by David Victor, **combines emissions trading and carbon taxation.** This mechanism would allow governments to set targets for both emissions quantities and prices by establishing a trading system with price

ceilings on permits. Some of the Kyoto complications would be eliminated by confining the system only to carbon dioxide. But there would be no absolute limit on the number of permits, so that if the trading price exceeds the target price, firms would be able to purchase new permits from governments at the lower issue price. Whenever the trading price dropped below the issue price, firms would purchase them at lower cost on the open market. Victor argues **that this would make it easier for governments to allocate commitments and permits, reduce firms' uncertainty about the costs of compliance, and enable compliance to be enforced by making the buyer liable for the seller's compliance as a way of discouraging "hot air" trading.**

Of course, the hybrid approach is not without its downsides. While it would encourage emissions reductions, **it would be less restrictive than the Kyoto trading system** because the number of permits would be less rigidly restricted. **Individual governments may be tempted by the prospect of extra revenue to sell permits below the agreed price.** It would still require a fairly intrusive system for monitoring compliance, especially to reveal differences in nominal and effective tax rates if governments opt to implement their obligations under the system solely by levying the emissions taxes and forgoing trading.

**The "clumsy approach"** is much less dependent on coordinated international action and **focuses on social learning.** Countries would pick and choose their policy measures that suit their particular circumstances. Such measures could range from informational instruments, such as labelling, through market instruments, such as emissions trading, to command and control mechanisms, such as technology standards. The benefit of this approach is that **it focuses on what governments, firms, and households actually do to reduce their emissions,** in marked contrast to the target setting that has characterized international policy making since the Toronto Conference of 1988. Since the exact consequences of any particular package of policy measures would be explicitly uncertain, governments would focus less on compliance with precise targets and more on a rough allocation of effort and the direction and pace of progress. **The flexibility of this approach would allow early mitigation efforts to serve as a series of policy experiments from which lessons could be drawn** about what works when and where. Cooperation, competition, and control could all be brought to bear on the problem as appropriate. A particular advantage of this approach is that it allows for "strategy switching". Policy actors (not just governments) would have the ability to abandon courses of action that are not working and transfer their efforts to those that do, without the necessity of renegotiating an entire international regime.

The problem with this approach is that its downsides mostly accrue to governments and the sense of loss of control could be problematic. Monitoring and verifying the actions of other nations would be a considerable challenge, but **part of the benefit for this approach is that it places less emphasis on the nation state and encourages transnational collaborations among firms, trade associations, local governments, nongovernmental organizations, scientific and technical organizations, and so forth.** Governments could negotiate performance benchmarks analogous to the OECD's Environmental Performance Reviews, which assess countries' environmental performance in relation to the goals that they have set for themselves. An approach of learning-by-doing may not be an elegant one, but it does

have the advantage that **it does not provide incentives for firms or countries to hold back from emissions reductions in the expectation that such reductions will have a future value that would be lost by action today.**

*This brief review of some alternative approaches to the Kyoto system of cap-and-trade is necessarily incomplete. At best it is only suggestive, but at least it does suggest that Kyoto need not be “the only game in town”. To put all of our eggs into the Kyoto basket seems to be a somewhat brittle strategy. The present imperative must be to open up new avenues for climate policy. The UK presidency of the EU and G8 represents an historic opportunity to do so.*