

Special Feature on the Kyoto Protocol

Kyoto and the Future of International Climate Change Responses: From Here to Where?

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This article gives a brief overview of the Kyoto Protocol, its core features of long-term relevance, the outlook to 2012, and the options for moving forward with a new round of negotiations on international climate change responses. It is concluded that major elements of the Kyoto system are now irreversible. This is not only because of ongoing implementation and political commitments, but because they embody an inherent logic about the process of seeking to limit carbon dioxide (CO₂) emissions and then seeking international flexibility and efficiency in the way such commitments are implemented. Also, Russia is almost certain to bring Kyoto into force, at a future time of President Putin's own preference, and Kyoto Parties have to act in this context. Academic research over the past few years has scoped out many possible types of elements of future commitments: there is now a large "toolbox" potentially available. None offer convincing replacements for a system that retains quantified emission commitments for the major industrialised countries at its core, but a far richer penumbra of supporting and extending agreements will be needed. The essential requirements will be: implementation of existing Kyoto commitments; new terms of engagement with the United States, driven first and foremost by the growing domestic forces there, rather than by tinkering with international design; and a new willingness of developing countries to engage in serious discussion about their appropriate role. Plausible ideas exist that could form the basis of an effective agreement built on the established process. The crucial question is whether the political will exists to start exploring them in a new round of negotiations.¹

Keywords: Climate change, Kyoto Protocol, International politics.

1. Introduction

This paper gives a brief overview of the Kyoto Protocol, its core features, and its political development. It then focuses upon the events since 2000 and their implications for the international process. The adoption of the Kyoto Protocol was hailed by some of those involved as one of the greatest achievements of international diplomacy in the late twentieth century, as it was set against a context of great scepticism among social scientists—and many participating governments—that the world could ever reach meaningful agreement on how to tackle such a fundamentally complex problem. Subsequent developments would appear to justify much of the initial scepticism, for the protocol is widely seen to be in trouble and the future steps highly uncertain.

This article aims to take a deeper look at the forces at play, as well as the main options, and what all this implies for whether and how global action on climate change can be taken forward.

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1. Note that the first part of this article is based upon a chapter by the author, titled "The Economics of the Kyoto Protocol," in Owens, A., ed. 2003. *The economics of climate change*. Also published in shortened form in *World Economics* 4(3) 2003.

2. The Kyoto Protocol: A technical overview

The main aim of the Kyoto Protocol is to contain emissions of the main greenhouse gases in ways that can reflect underlying national differences in emissions, wealth, and capacity, following the main principles agreed in the 1992 United Nations Framework Convention on Climate Change (UNFCCC). These include the need for evolutionary approaches and the principle of “common but differentiated” responsibilities, including leadership by the richer and higher-emitting industrialised countries. For a comprehensive analysis of the regime, see Yamin and Depledge (2004).

The emissions context

The large divergence of emissions between countries is illustrated in figure 1, below, which shows the global distribution of carbon dioxide (CO₂) emissions in terms of three major indices: (1) emissions per capita (height of each block); (2) population (width of each block); and (3) total emissions (product of population and emissions per capita = area of block).

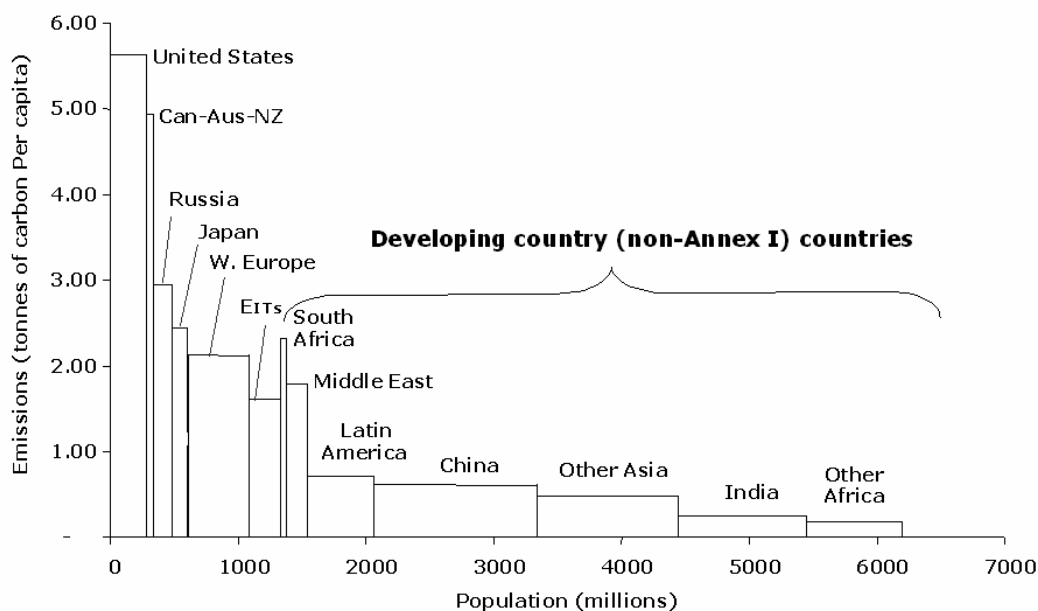


Figure 1. CO₂ emissions per capita and population by region in 2000

This figure illustrates several relevant dimensions. Per capita emissions in the industrialised countries are typically up to ten times the average in developing countries, particularly Africa and the Indian Subcontinent. This is one of the reasons why industrialised countries accepted the responsibility for leading climate change efforts in the UNFCCC and subsequent Kyoto negotiations: unless they can control their own high emissions there is little political prospect of controlling emissions from

developing countries that start from a very much lower base.² Following the agreed negotiating mandate,³ in Kyoto the countries that took on quantified commitments for the first period (2008–12) are the industrialised countries as listed in Annex I to the treaty, which corresponds roughly to those with emissions in 1990 of two tonnes of carbon per capita (2tC/cap) or higher.

There are also large differences within each group: per capita emissions in the European Union (EU), Japan, and the economies in transition (EITs) are about half the levels in the United States, Canada, and Australia; whilst some individual non-Annex I countries have per-capita emissions comparable to many in Annex I (South Africa is illustrated, but it is true also for some of the “Asian tiger” economies).

At the same time, the currently low emissions and large population of the developing countries in aggregate indicate the huge potential for global emissions growth, if and as their emissions climb towards anything like levels in the industrialised world. The Kyoto negotiations were marked by big tensions on this issue. In the final agreement, in addition to provisions on national reporting and technology transfer, was the Clean Development Mechanism, which is intended to help developing countries move on to more sustainable and lower-emitting paths of economic development without these countries themselves bearing the assumed costs. The general assumption in Kyoto is that developing countries will be brought into the system of quantified commitments over time, in subsequent negotiation rounds, if and as the richer countries fulfil their first-round commitments; and the implicit threat (or bargaining counter) is that industrialised countries will refuse to take on subsequent commitments unless there is progress in this direction.

2.1. The Kyoto first-period commitments

The Kyoto “Assigned Amounts” specify allowed national emissions for the period 2008–12, subject to the adjustments that could be made through the international flexible mechanisms. The United States in its original protocol submission had proposed a second commitment period to follow the first, with an allowance for banking and borrowing of emission commitments between the two periods. The difficulties in negotiating a single set of commitments were so huge as to make this impractical. Instead, the protocol commits parties to open negotiations on a second commitment period no later than 2005, and countries that over-achieve their commitments in the first period can “bank” their unused allowances for use in the subsequent period. Suggestions that countries might “borrow” emissions from subsequent periods were recognised as impractical, but the idea was transformed into part of the compliance package.⁴

2. Article 4.2 of the UNFCCC commits industrialised countries to adopt “policies and measures that will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objective of the Convention,” with the initial “aim” of returning their emissions of CO₂ and other greenhouse gases to 1990 levels. This became the focus of attention in the years immediately after the UNFCCC was agreed, and the failure of key industrialised countries to move in this direction was a principal reason why Kyoto moved to binding commitments focused on the industrialised countries.
3. The first Conference of the Parties (COP 1) agreed that the UNFCCC commitments were inadequate and consequently to “begin a process to enable it to take appropriate action for the period beyond 2000, including the strengthening of the commitments of Annex I Parties, i.e., the industrialised world,” to (a) “elaborate policies and measures” and (b) “set quantified limitation and reduction objectives” within specified time-frames, such as 2005, 2010, and 2020. It was agreed that these negotiations “should not introduce new commitments for developing countries,” but should enhance the implementation of their existing commitments under the UNFCCC. Thus were launched the intensive negotiations that finally culminated in the Kyoto Protocol.
4. With “borrowing” there would be no point in time at which a country could be assessed as being out of compliance, hence no point at which to apply any enforcement procedures—a strange interpretation of the term “binding.” The United States recast

The negotiations never questioned that Annex I commitments should be defined in terms of changes from historic levels; proposals for other indices, such as defining emissions relative to population or gross domestic product (GDP), remained confined to academic literature as they involved changes far greater than countries were willing to contemplate. The UNFCCC had used 1990 as the base year for its non-binding aim—a date which had a huge significance as the year in which all governments, by endorsing the first report from the Intergovernmental Panel on Climate Change (IPCC), formally recognised climate change as a serious issue, and launched the negotiations that led to the Convention on Biological Diversity.⁵ The 1990 base year remains as the reference point for the first-period commitments; proposals to shift the base year for Kyoto forward to 1995 were rejected on the grounds that such a change would reward those countries that had done nothing to limit emissions since the UNFCCC process was launched.⁶ This has, however, raised varied issues, which will be discussed below.

As with any major international negotiations, the numbers can only be understood as the outcome of a highly political process arising from the clash between competing numerical aims, structural visions, and root conceptions of political imperative—all combined with the personal and political dynamics of the final days at Kyoto.⁷ The dominant and almost obsessive focus in the negotiations was on how to distribute OECD commitments. Flat-rate emission targets appeared attractive because of their simplicity, and have indeed been a feature of the first round of several previous international environmental agreements, which have become subsequently more differentiated over time. In addition, there was no specific logical basis upon which to agree differentiated commitments.⁸ The final agreement embodies a

its borrowing proposal in the form of a penalty for non-compliance (a deduction from allowances in the subsequent period) which was taken up in the subsequent Marrakesh Accords.

5. The convention, also known as the Rio Convention, was signed in 1992 in Rio de Janeiro at the United Nations Conference on Environment and Development (UNCED) by a large number of nations and entered into force in December 1993.
6. A 1995 base year would have made life much easier for those, like Japan and the United States, whose emissions had risen since 1990, and it would have allowed a more impressive headline figure to emerge for these countries' commitments. Arguably, it would also put the economies in transition on a more comparable footing. But it would have created a whole new set of problems for handling EIT commitments and rewarded inaction. 1990 remains as the official point of reference for when countries first accepted that climate change was a problem, and industrialised countries had already agreed under the UNFCCC to aim to return their emissions to 1990 levels as the demonstration of their commitment to lead the global effort.
7. The central clash was between the European Union's aim of flat-rate reductions for all in the range 10–15 percent below 1990 levels, and US and Japanese support for reductions of 0–5 percent, with varied ideas about differentiation and flexibility, combined with Russian sensitivities and the special circumstances of some of the smaller countries. The United States traded percentage points for increases in the degree of flexibility (e.g., inclusion of sinks enabled them to add three percentage points; after Kyoto, the United States argued domestically that in reality it had only had to concede an additional two percentage points from its original negotiating position of zero, the rest being directly tied to increased flexibilities). Japan, the third party in the interecine Organisation for Economic Co-operation and Development (OECD) debates, was dragged reluctantly along to higher commitments than it had prepared. Russia started with zero and, annoyed by the EU's opening ministerial reference to the importance of keeping the "three major Parties" at the same level, refused to budge. All this was overlaid by root political objectives and perceptions that pegged some countries' numbers to those of others. Countries with economies in transition aspiring to membership of the EU or OECD wanted to align themselves with the EU's standard-setting commitment. Canada honored its status as a G7 member by staying within the "leading"; Australia, feeling no such constraint, simply insisted on being allowed a big increase.
8. Every country that supported differentiation had a different idea of how it should be calculated. Many different indicators were proposed, relating to GDP, energy intensity, carbon intensity, historical emissions, trade patterns, etc. Most "differentiators" argued that low carbon intensity (i.e., low carbon emissions relative to GDP) in 1990 should be a basis for a weaker target; but Australia argued precisely the opposite, claiming that high carbon intensity showed an innate dependence upon fossil fuels that could only be broken at great expense. Almost the only common theme to emerge was that each country proposed indicators that would be most beneficial to itself.

small amount of differentiation among the dominant industrial powers, and wider differentiation for smaller countries.⁹

As well as the basic distinction between industrialised and developing countries, Kyoto acknowledged the need for “greater flexibility” with respect to EITs, in terms of both financial commitments (which are restricted to the OECD countries listed in the UNFCCC’s Annex II) and commitments on emissions, which had in general declined by 20 to 40 percent during the process of economic restructuring. Most of the Central and East European countries agreed to go along with the EU’s commitment of 8 percent below 1990 levels;¹⁰ Russia and Ukraine, however, insisted on a right to return to 1990 levels.

2.2. The “Kyoto mechanisms”

The provisions on sinks and the various “flexibility mechanisms” in the Kyoto Protocol (discussed below) mean that countries do not have to achieve these emission targets entirely domestically—but just how much flexibility these offered in principle, especially when combined with the provisions for them, was not appreciated at the time.

Emissions trading—which under the protocol enables any two Parties to exchange part of their emission reduction commitment—proved to be one of the most controversial areas of the negotiations, though for different reasons in different quarters.¹¹ The bare minimum of enabling language survived in the protocol itself, and it took four years of further negotiations to elaborate this into a workable structure governing international emissions trading; the 2001 Marrakesh Accords finally established all the basic machinery for trading (inventories, reporting, monitoring, etc.), but apart from requiring governments to fulfil these, set no other significant constraints on trading.

Whilst emissions trading generated the greatest political contention, in practice the project crediting mechanisms of joint implementation (between Annex I countries) and the Clean Development Mechanism (CDM) have attracted far more institutional attention and activity. In particular, governance of the CDM has been complex in trying to secure its twin aims of helping developing countries achieve sustainable development and of generating “certified emission reductions” that Annex I Parties may then use to “contribute to compliance with part of their quantified commitments.” Although the first projects have been approved, the scale of activity in the CDM looks likely to be a small fraction of the original ambitions.

9. In the central political dialogue between the United States and the European Union there was a kind of logic to equal percentage cuts from 1990 levels. The US, with per capita emissions almost twice those of most other OECD countries except Canada and Australia, was seen by others to have huge potential for reductions so that it should cut back by more than other countries. Yet internal political pressures pointed in the opposite direction: the US had the greatest difficulty in mustering any domestic support even for stabilizing emissions. Economic studies of the time varied in their estimates of which would bear the higher cost under equal reductions from 1990 levels. Equal reductions between the US and the EU seemed the only safe solution in such a peculiar political context, and the most obvious way of keeping the US commitment “in line” with the international community, in some basic psychological sense.

10. At a late stage of negotiations, Poland and Hungary moved back to minus 6 percent in protest at the weaker Russian and Ukrainian allocations.

11. Among the industrialised countries, Japan and some of the EU member states wanted to ensure that any such trading was competitive and transparent so as to prevent the United States using its political leverage to gain preferential access, particularly to the likely Russian surplus; the European Union was also particularly anxious that trading should not enable the United States to avoid domestic action as the main agent. The developing countries, however, objected more on basic principles, fearing the wider implications and that the US’s overwhelming economic power would allow it to use the flexibility to its own advantage over the interests of weaker countries.

2.3. Other elements

The Kyoto Protocol contains many other provisions. These include specific commitments relating to policies and measures, in accordance with the original mandate of negotiations. Article 2.1 provides a wide list of measures, ranging from energy efficiency and subsidy reform through to technology research, development, and dissemination. Generally, these were promoted by some—notably the EU, which tabled extensive proposals on policies and measures very early on in the negotiations. Few of these gained acceptance, however, and as summarised in box 1, the final phrasing was almost entirely non-binding; countries were extremely resistant to anything that could intrude directly on national sovereignty over the choice of instruments adopted. These references, however, could provide important pressure points and hooks upon which to build subsequent negotiations on more specific actions, including international collaboration under Article 2.1(b).

Box 1. Elements of policies and measures in the Kyoto Protocol

2.1 Each Party included in Annex I... shall:

(a) Implement and/or further elaborate policies and measures in accordance with its national circumstances, such as:

- enhancement of *energy efficiency* in relevant sectors;
- protection and enhancement of *sinks and reservoirs*;
- promotion of sustainable forms of *agriculture* in the light of climate change considerations;
- promotion, research, development and increased use of *new and renewable forms of energy*, of carbon dioxide *sequestration* technologies and of advanced and innovative environmentally sound technologies;
- progressive reduction or phasing out of *market imperfections*...that run counter to the objective of the Convention, and apply *market instruments*;
- measures to limit and/or reduce emissions...in the *transport* sector;
- limitation and reduction of *methane*...through recovery and use in waste management...and [provision of] energy.

Plus one catch-all sub-paragraph encouraging “appropriate reforms in relevant sectors.”

(b) Cooperate with other such Parties to enhance the individual and combined effectiveness of their policies and measures

2.2 Pursue limitation or reduction of emissions...from *aviation and marine bunker fuels*, working through the International Civil Aviation Organization and the International Maritime Organization, respectively.

2.3 Strive to implement policies and measures...in such a way as to minimize adverse effects...on other Parties.

The protocol contains many other provisions. A number of these place requirements on all countries, including developing countries, for example, to report on national emission inventories and on policies and measures being adopted to tackle climate change. In addition, the provisions on technology transfer indicate increased attention to the importance of global diffusion of cleaner energy technologies. Many of these elements build upon provisions in the UNFCCC itself, extending and being more specific about the actions required.

The Kyoto Protocol also restates a principle of protecting countries from possible adverse effects of any of the policies and measures that may be adopted, “including the adverse effects of climate change,

effects on international trade, and social, environmental and economic impacts on other parties, especially developing country parties.”

Like most international treaties, the explicit consequences for non-compliance are weak compared to domestic law; the most concrete are that failure to meet the quantified commitments in the first period automatically disqualifies a country from participating in the mechanisms and it will be penalised by deductions from allowed emissions in subsequent rounds with a 30 percent penalty factor. Nevertheless, the compliance section was one of the most highly contested in the Marrakesh Accords. The restatement of the principles that the commitments are legally binding, and the establishment of an enforcement branch in the compliance committee, make the compliance package considerably stronger than in most treaties. The intense political effort put into the final negotiations on compliance, and the outcome, emphasise that most countries do not consider ratifying and then abrogating the treaty to be an option.

2.4. The Kyoto structure for the longer term

Although debate about Kyoto has tended to focus almost obsessively on the first-period commitments, the basic intent is to provide the structure for a dynamic, evolving regime that can effectively tackle climate change over the course of the century. The current set of emission targets for the first commitment period represent the first concrete step in a much longer-term process of negotiating emission commitments over successive periods. Negotiations on second-period commitments are due to start by 2005; it is generally assumed this would take the form of another five-year period, centered on 2015, though a different time span would be legally possible.

The current first-period emission targets are intended to meet the UNFCCC requirement that industrialised countries should take the lead in tackling climate change by modifying their emission trends, and to provide a period of institutional development of the mechanisms, regime architecture (such as inventories), and national programmes for tackling emissions. The first-period commitments were never intended to provide the definitive solution to climate change, indeed a moment's thought reveals that no agreement reached in the 1990s could sensibly provide a one-step solution to such a massive and long-term problem.

Second and subsequent periods are likely to require more stringent emission reduction commitments, and for a wider group of Parties, thus gradually “ratcheting-up” the protocol and its resulting environmental effectiveness. Similarly, the Montreal Protocol's initial target of a 50 percent cut in chlorofluorocarbon (CFC) emissions was far from being environmentally effective, but was progressively tightened over time to greatly increase the treaty's environmental impact. Figure 2 shows Kyoto's first-period commitments in context and underlines how the protocol's ultimate impact will depend upon the degree and scope of follow-up to this initial action. The figure also shows that global emissions in the longer term cannot effectively be contained without greatly lowering emission trajectories in developing countries as well.

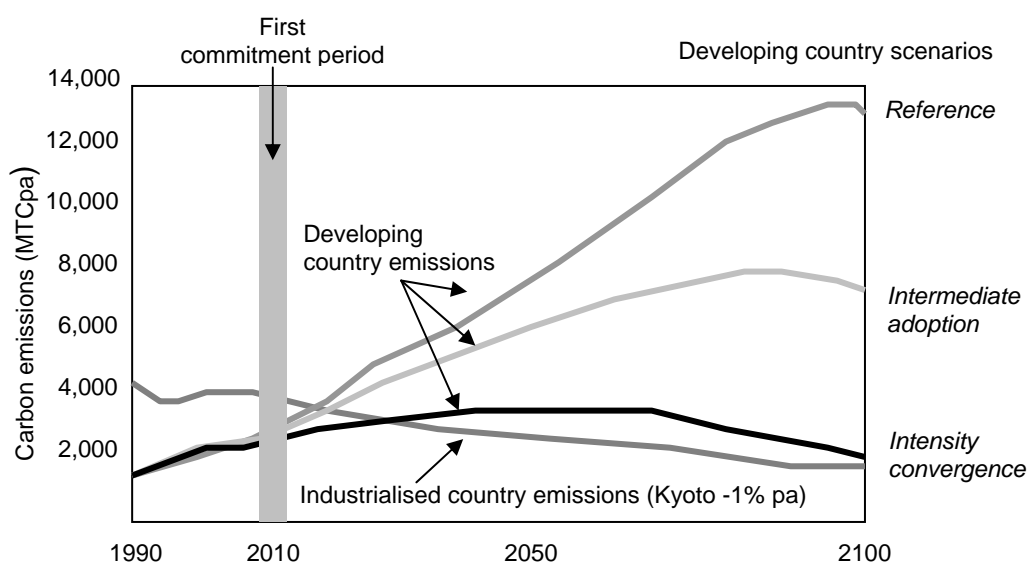


Figure 2. Kyoto first-period commitments in context of global emissions' dependence upon follow-up and spillover

Source: Grubb, Hope, and Fouquet 2002.

Note: The figure shows emissions from industrialised (Annex 1) countries, up to 2010, assuming that they meet the Kyoto first-period commitments and then follow with reductions averaging 1 percent per year in subsequent Kyoto periods. Emissions from developing countries are modeled in terms of the assumed degree of economic, technological, and political spillovers, the latter including expansion of the commitments to include more countries over successive negotiating rounds. In the "intensity convergence" scenario, aggregate developing country emission intensity (per unit GDP) converges linearly to the same level as industrialised countries over the century.

3. From Kyoto to the present

At first, the omens for Kyoto seemed good. Despite the intense controversy of the negotiations and the concessions made in its completion, all Parties seemed set to accept the deal as a reasonable compromise that preserved the essential elements required to tackle the problem. The treaty was rapidly signed by most of the countries involved. The US signature at the Buenos Aires conference a year later (COP 4, in 1998), and the adoption of the Buenos Aires Plan of Action, setting out the agenda of specific implementation issues to be resolved, set the stage for the next phase.

That stage, which culminated in the collapse of The Hague (COP 6, part 1) negotiations two years later, was a period of regression, retrenchment, and increased politicisation, for which the blame can be spread liberally. The European Union clung obstinately to a proposal to impose limits on use of the Kyoto mechanisms that alienated the rest of the industrialised world, diverting most of the negotiating effort on the trading mechanisms into bad-tempered bickering. Japan seemed frozen into a formulaic approach to its target, reflecting internal battle about the nature of the commitments and flexibilities. The final years of the US's Clinton administration achieved almost nothing in the way of domestic

implementation, or even domestic understanding of the agreement, which the United States had pioneered. And the main axis of Russian engagement was with a small clique being promised gold from the trading mechanism, rather than any serious engagement on the nature of the problem and the fundamentals of Kyoto going forward. The developing world, for its part (discussed more fully in the following article) seemed captured by the Saudi demand for the unacceptable proposition that some of the most richly endowed countries on earth should be compensated for the possible slight slowdown in the rate of expansion of their oil exports—a demand that was used to hold hostage constructive engagement in relation to developing country actions. Progress on all fronts seemed small-minded and highly politicised.

The collapse of The Hague negotiations, examined elsewhere (Grubb and Yamin 2001), could have been cathartic, bringing countries back to the realities of the problem, the important issues, and their common interests and responsibilities. It also meant that the new Bush administration was faced, not with a *fait accompli* but with an essentially open agenda of negotiations on the terms for interpreting Kyoto and its wide-ranging flexibilities, or even renegotiating some elements *in extremis*.

3.1. The paradoxes of US rejection

Instead, the Bush administration's prompt rejection of Kyoto and refusal to negotiate on the basis of it, threatened the basic fruit of ten years of global negotiations, and provoked fallout that defines the landscape today. These can be seen in terms of a number of paradoxes.

The first paradox is that the United States was, in effect, rejecting its own treaty. The vast majority of the Kyoto Protocol was in the image of the US proposal of January 1997, and most other countries—in addition to accepting the basic structure as the only credible way forward—made major concessions to secure US participation. The simplest explanation of the paradox is that, in the eyes of the Bush administration, he was rejecting Clinton's treaty, and neither the rest of the world—nor the issue itself—really mattered. The Bush administration's statements at the time made it plain that they did not understand the treaty they were rejecting, describing it with caricatures that bore little relationship to reality. In its follow-up, however, the administration refused to discuss *any* structure involving binding, quantified emission targets.

The second paradox is that the US declaration of the death of Kyoto finally brought it to life. The European Union, still nursing the wounds and pondering the lessons of The Hague, found it suddenly bore the central weight of deciding whether and how to save the global effort—its transformation in the first half of 2001 was an astonishing institutional turnaround. The developing countries too were faced with the realisation that there were more important things at stake than defensive posturing around a moribund agenda of North-South conflict.

The third and related paradox is that Bush's brusque rejection of Kyoto actually raised the profile of the climate change issues and provoked, rather than deterred, stronger domestic action. This applied both internationally and within the United States. Within the US, the stark reality that the Bush administration had no significant intent to address CO₂ emissions in effect devolved the issue to the level of individual states. Indications of the response are to be found in numerous initiatives. Probably

the three most important ones to address CO₂ emissions are the Californian proposals to regulate vehicle emissions; the proposals by New York and nine other Northeast states to implement a CO₂ trading system; and the coalition of clean energy funds that now comprises state-backed action in fourteen different US states. Thus, none of the most important actions in the United States involve the Bush administration, and indeed one (the Californian regulations) is being vigorously opposed by it. But the initial fallout was similar, too, elsewhere. Most notably, the European Union, stung by US criticisms that it was all words and no action, performed the politically unprecedented feat of agreeing within less than two years the Emissions Trading System (EUETS), a far-reaching measure that now, in the enlarged European Union, harnesses twenty-five countries into the first major effort to limit industrial CO₂ emissions.

The fourth paradox is that the US's rejection has arguably clarified the basic case for a Kyoto-like system. In rejecting Kyoto, the United States promised to propose an alternative. But the failure of the Bush administration—or indeed any other country—to come forward with any significant alternative, has strengthened the conclusion that the only effective approach may indeed be a structure based around sequentially negotiated national emission caps.

The short-term effects of the US rejection, in other words, were almost all positive. The outstanding question is whether it has, nevertheless, done fatal long-term damage to the global architecture.

3.2. The balance of supply and demand in the Kyoto system

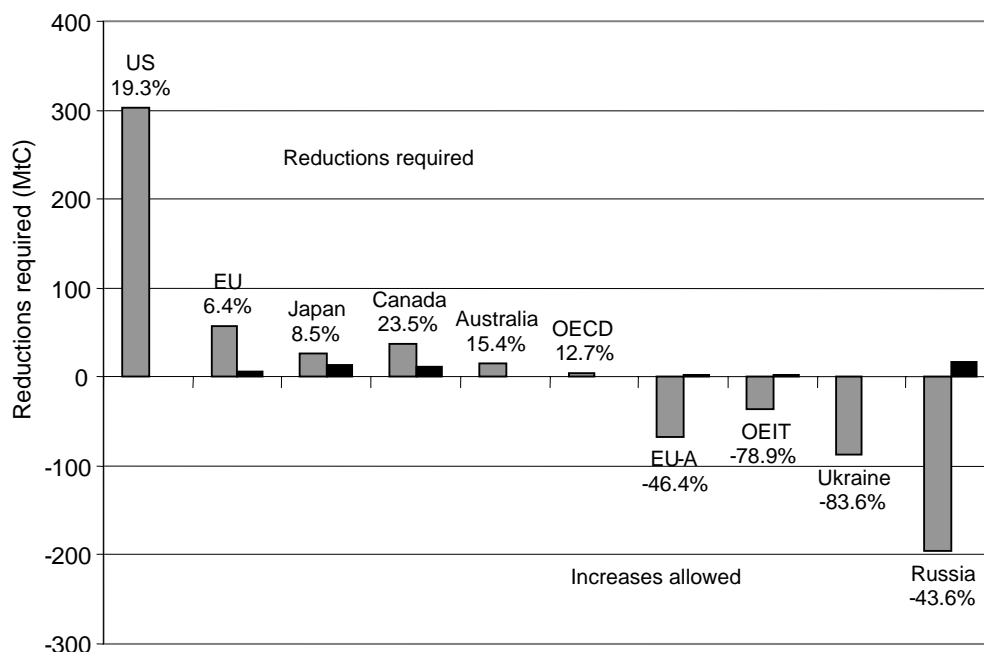
The final paradox is that the US rejection of the Kyoto Protocol has made it potentially cheaper for everyone else to implement, by removing the biggest potential demand in the international trading system—whilst making progress politically more difficult.

The numerical consequences can be understood from figure 3, which represents the nearest thing to observable data on the potential “supply/demand” balance.¹² The main bars show the gap between countries' recent emissions and their Kyoto allocation. Thus, US emissions in 2000 were 300 million tonnes of carbon (MtC) above their Kyoto allowance, and would have to be reduced by 19.3 percent to get down to their original Kyoto allocation (7 percent below 1990 levels). EU emissions had roughly stabilised at 1990 levels and the gap was only 70 MtC (6.4 percent), whilst Canada faced a gap of ca. 40 MtC, the highest percentage of any due to its rapid growth since 1990.

In stark contrast, the bars on the right-hand side of the graph illustrate that emissions in the EITs had declined since 1990 to far below their Kyoto allowance. The “headroom” currently available to Russia and Ukraine (respectively, 200 MtC and about 90 MtC) is far larger than any of the individual shortfalls of OECD countries other than the United States. In total, in fact, the sum of all these data indicate that the *aggregate* emissions of Annex I countries in 2000 (including the US) were already below the *aggregate* Kyoto cap of minus 5.2 percent, but with a huge East-West discrepancy in the distribution.

12. Industrial CO₂ here refers to all CO₂ emissions from industrial activity, specifically energy-related activities. This accounts for about 80% of the total GHG emissions across all industrialised countries. Thus the absolute tonnes involved will be higher for the Kyoto basket in full than indicated in figure 4. For figure 4, every effort has been made to set the base year on the same basis as the recent emissions (i.e., industrial CO₂), and remaining discrepancies are too small to affect the main points of this analysis here.

Emissions gap (2000) from Kyoto target (with % gap), and managed forest allowance (MtC)

**Figure 3.** Kyoto commitments and trading potential

Key: EU-A = the ten Accession countries that joined the European Union in 2004; OEIT = the five other countries applying for EU membership; OECD = all other OECD countries. Data represents total national CO₂ emissions.

Source: Grubb (2003)

Note: The main (single or larger) bars show the gap between 2000 emissions and Kyoto commitments for the principal countries/groups in Annex I. The smaller bars alongside show the maximum allowance that each can claim for carbon absorbed from managed forests under the Marrakesh Accords (excluding the US, which is not included in that agreement), which can in effect be deducted. Percent numbers show the percent cut required to get from current levels to the Kyoto targets (negative numbers indicate the corresponding percent growth from current levels for EITs).

For some years after the Kyoto agreement, the usual economic perspective was that emissions in all these regions would rise substantially in the absence of strong action to limit domestic CO₂ emissions, implying a high carbon price if countries were to cut back emissions enough to comply.

The US withdrawal obviously radically changed the situation, but it is not the only factor. Emissions—not for the first time—have failed to increase in the way projected in many economic models, and indeed have remained roughly constant in the EITs despite resurgent economic growth. Many of the earlier studies used already outdated projections and neglected non-CO₂ gases and carbon sinks, allowance for the latter having been enhanced under the Marrakesh Accords. The smaller bars in figure 3 illustrate the contribution of the carbon sink allowance for managed forests under the accords, which make a crucial contribution for Japan and Canada in particular.

The net result is to leave a large potential supply set against radically reduced demand. Economic modeling studies (e.g., reviewed in Springer 2002; Buchner et al. 2002; and Grubb 2003) now almost

uniformly find that there will be a net surplus, implying an “equilibrium price” of zero. Indeed, when all aspects are considered, it seems plausible that even in the absence of Russia, the surplus in Ukraine—which ratified Kyoto in early 2004—would, along with all the other flexibilities, be sufficient to cover the likely domestic shortfall in the European Union, Japan, and Canada. Most economists have now totally reversed their assessment of a few years previously; models that treat Kyoto as a pure international trading market are interpreted as predicting that the agreement will result in hardly any real action being taken.

4. The international system out to 2012

In practice, the idea that action under Kyoto will be dissipated in a sea of valueless paper trades is no more realistic than the former assessments: countries are prioritising domestic action; the Kyoto “market” is far from fully competitive; uncertainty remains about Russian participation; and importing countries are clearly exercising “buyer sovereignty” in being cautious and discriminating about the international units they acquire.¹³ Grubb (2003) argues that the result will be wide differentiation of Kyoto units, according to how the different buyers view the various types and sources of project credits and domestic trading systems:

[P]rices for companies engaging in Kyoto-compliant projects in developing countries and EITs are likely to be in the range €0–25/tCO₂ for the smaller-scale, widely-approved projects such as renewable energy investments, and €–15/tCO₂ for more potentially controversial (and lower cost) projects including land-use, but also for example for large-scale boiler retrofitting or gas conversion....[In] turn, the prices for large-scale transfers of AAUs between governments may be lower still; but the private sector will not be given access to these. The reason for this, fundamentally, is that although emissions trading under Kyoto has been analysed as one instrument, in reality it will be used to fulfil two quite different functions. One is the traditional role of providing market flexibility and efficiency at the margin of project investments. The other is fundamentally a redistributive function, correcting the excessively lop-sided nature of the original Kyoto allocations. The cost of making such transfers at the “market” price that would be required to sustain effective action on climate change is politically untenable. Neither “east nor west” has the market power to exact such a price, nor could the fledgling Kyoto institutions withstand the political pressures such transfers would generate. So, large-scale intergovernmental transfers, most notably for Canada, will occur at much lower prices—and domestic programmes, and the private sector, will be shielded from the malign influence that such low prices would otherwise exert on international efforts to initiate some real action under Kyoto....Thus in the “Kyoto market” there will be not be one uniform “price of carbon,” but many diverse prices....This in fact is a characteristic of the nascent private sector market at present. Companies are more willing to pay for emission credits from projects that are perceived as very high quality and uncontroversial—projects to which hardly anyone is likely to object, and which seem likely to attract the approval of both governments and NGOs. Emission credits or allowances from other sources may be traded, but at a discount. For Kyoto’s first period, price convergence,

13. The most obvious example of this is the EU emissions trading system and its accompanying Linking Directive, addressed elsewhere in this special issue of the International Review of Environmental Strategies.

stability and greater homogeneity could only realistically be expected both as the institutions mature and if the supply overhang were somehow eliminated to make the market much “tighter.”

In this context, perhaps the most striking feature of Kyoto is its durability and flexibility. Despite the shock of the US rejection, the rest of the world proceeded to negotiate the rules for implementation, and by September 2004, 125 countries had ratified. Notwithstanding the Russian prevarications, countries have proceeded to hammer out their first significant steps in implementation, establish the domestic machinery required for participation, and, increasingly, are engaging in actual project development under the mechanisms.

It now seems clear that much of the Kyoto structure is irreversible, not only because of the institutional and political investment made, but also because it embodies a certain unavoidable logic associated with tackling emissions through quantified commitments and recognising the need for flexibility in their implementation. In outline, indeed, there now seem to be only two main types of scenario left for the international system out to 2012.

In the event that Russia does not ratify, most international engagement will be driven directly off the emerging domestic trading systems—in particular the European ETS, which would then become the centrepiece of global climate action. This would do most to define the structure and the links, not only with project investments under joint implementation (JI) and CDM-type linkages but also with emergent domestic trading systems in Canada, the Northeast US states, and potentially Japan, some Australian states, and possibly even some leading newly industrialised countries. This explains why some EU-based multinational companies that had supported Kyoto have become more nuanced in their views; the prospect of mechanisms defined and implemented through the EU trading system, rather than through the bureaucracy of the formal UN processes, has a considerable appeal to them.

There are two main variants to this scenario. If the European Union and Japan at least were to stick to their Kyoto targets, the system would actually be environmentally stronger than if Russia ratified and introduced its surplus credits. If they abandoned their national targets, of course, the system would be much weaker—but it would continue, as it is already apparent that the leading industrial countries will engage in some international investment for a host of reasons.

In practice, barring some overwhelming political shock, it seems certain that Russia will ratify, for two big reasons. The first is political. President Putin’s statement following the May 2004 European Union–Russia Summit was unambiguous in stating that Russia would “accelerate the process of ratifying Kyoto,” and President Putin’s international promises in other fields have so far proved robust. Moreover, his statement was embedded in the context of accession to World Trade Organization (WTO) negotiations. WTO accession has certain implications for Russian energy and it will need foreign investment, and the EU wants Kyoto credit trading to be part of the incentive package surrounding its investment in Russian energy, so the two are linked substantively as well as politically. Since the Russian application to join the WTO is a one-way street—it is unthinkable that it will not eventually happen. Russian ratification of Kyoto is similarly assured. But Putin will directly control the timing.

The other reason why Russia will ratify Kyoto is that the economic gains from doing so will become more and more transparent over time. Over the next couple of years, it will become obvious that Russian

emission trends are not miraculously defying the general pattern of economic transition and will indeed leave Russia with a large surplus; and the longer Russia prevaricates, the more JI investments will start to accumulate in its neighbour, Ukraine. Even if the European Union backed away from its enthusiasm to be bound by its Kyoto target, President Putin—under growing pressure from the Russian government ministries and Russian business—would not forever yield to the anti-Kyoto paranoia of his economic advisor, Andrei Illarionov. Russia will eventually bring Kyoto into force—but the timing will suit President Putin, and no-one else.

5. Structural options for going forward

Given the difficulties and traumas associated with getting Kyoto into force and implementing its first-period commitments, and the insistence of the current US administration as well as developing countries that they are not willing to consider adopting quantified emission caps, what alternatives are there for future structures? Options include those reviewed in IEA (2002), Baumert et al. (2002), and Aldy et al. (2003). Also notable is the concern that the Kyoto process became too obsessed with the issues surrounding the core Annex I commitments and trading, at the expense of a deeper understanding of the concerns of developing countries as already embodied in the UNFCCC (Najam et al. 2003).

5.1. Challenges of a technology-led international approach

Some proposals for alternatives are demonstrably unconvincing or incomplete. The current US position is to focus upon technology programmes, and it is extending these internationally through a growing number of bilateral technology cooperation agreements. Low-carbon technologies, obviously, are a key part of long-run solutions. But there are four good reasons why technology cooperation in itself cannot form the bedrock of effective global action.

Technology choice and capture. First, governments are not good at developing technology. There is a crucial role for governments, of course, but the history of government-driven energy technology programmes gives good grounds for caution. The US Synthetic Fuels Corporation and the British Advanced Gas Cooled Reactor programme each cost many billions, and the latter moved on into large-scale production of essentially uneconomic technology at a total cost exceeding US\$100 billion. The fundamental reason is “mutual capture.” Large-scale government expenditure generates a community of people that depend on that finance (so they then have to play up the prospects) and a governmental bureaucracy that also has a huge stake in maintaining the programme. The result is an overwhelming bias that protects the technology from the harsh winds of commercial reality for as long as humanly possible (Cohen and Noll 1991).

The second and reinforcing problem is that such difficulties are multiplied many times in the context of *international coordination problems*, where the structural problems are exacerbated, as countries have to lock themselves into a complex set of funding commitments, and by the competitive nature of the enterprise. No country wants to give away its most valuable technological expertise. The result is that major international technology cooperation tends to occur primarily where no-one really expects any commercial returns for many decades, at best, such as with nuclear fusion.

Third is the sheer breadth and complexity of emission sources that drive climate change, and the huge variety of range of technologies for tackling them, which implies an unmanageable *negotiating complexity*. Emissions arise from the breadth of industrial activities, various end-uses in buildings and transport, and a huge variety of other personal consumption activities—that is before even considering agricultural and land-use sources. The complexity even within just industrial technologies appears prohibitive. The UK Carbon Trust, for example, as part of its role to help industry deliver on the United Kingdom's Kyoto targets, manages a list of approved energy-efficient technologies for which companies can get enhanced capital depreciation allowances. There are over 6,000 products on the list. Even if some could be grouped, the idea that international negotiations could directly drive the development and diffusion of so many different technologies betrays a fundamental misunderstanding of the nature of the climate change problem. So does the idea that countries could, or should, get together to agree on a list of products and the domestic incentive measures to promote them.

Finally, this points to the most basic flaw of the technology-led approach, namely, its *inconsistency with market economics*. The modern literature on innovation emphasises the crucial role of the private sector and market feedbacks in the innovation process, if any technology is to traverse the “technology valley of death” between government research and development finance and commercial product. It is a great irony that a Republican US administration, in its desire to find alternatives to Kyoto, risks advocating a strategy that could require a massive global bureaucratic process to try and drive the technology choices of millions of private enterprises, or at least, to try and do their research and development for them in the vague hope that they will pick up the products without any real market incentive to do so.

To be credible, therefore, technology development and cooperation needs to be built in as part of a strategy that also builds markets for low-carbon technologies and provides incentives for emitters of all sorts to adopt them and to use energy more efficiently.

For certain categories of technology, one can envisage international agreements on market promotion. There are calls for global targets on renewable energy, for example, that might be devolved into specific national programmes on “renewable portfolio standard” type legislation. This is an exception, however—and probably one that proves the rule, when one considers the difficulty of negotiating targets adapted to domestic resource and political considerations in the electricity sector, not to mention the views of countries that have emissions predominantly outside power production.

The most obvious, generic way of providing incentives for cleaner technologies is through some form of carbon constraint or pricing strategy. International agreement on carbon tax levels, as proposed by some, is obvious political fantasy for reasons I sketched more than fifteen years ago (Grubb 1989). The fiasco of the European Carbon Tax proposals in the early 1990s is proof enough of the points made there. If international action is to continue being defined in terms of overall national commitments, the fundamental metric has to be the most obvious and direct one—namely, in terms of national emissions.

5.2. Alternative ways of defining national emission targets

Kyoto focused upon absolute emission caps for industrialised countries, with the CDM and supplementary measures engaging developing countries. In fact, there is a far richer range of approaches that could be considered.

There are two main structural ways of quantifying emission targets, each of which can be implemented in several different ways (see table 1). The two quantification approaches are absolute (defining emissions in a given period) and indexed (emissions in a given period relative to some index). Indexed targets at the national level are usually discussed in relation to GDP (“intensity targets”), though in industry sector agreements they are more commonly denominated relative to an index of relevant physical quantities (e.g., per tonne of steel produced).

Several distinct issues surround the debate between absolute and intensity targets that raise the basic question as to whether GDP-indexing really has advantages, and if so what they are (beyond the purely rhetorical one of making any given reduction look bigger by comparing it to GDP growth):¹⁴

- The main argument is that indexing targets in relation to GDP considerably reduces the economic uncertainties and risks, based on the underlying assumption that economic growth drives emission increases. The problem with this claim is that for many industrialised countries it is just not supported by the evidence of the past few decades: once population growth is factored out, the relationship between CO₂ and GDP has been weak to non-existent. For example, CO₂ emissions per capita in both the US and the UK have remained virtually constant *since* 1950, and the surge in US GDP since the mid-1990s has had little discernible influence on its per-capita CO₂ emissions.
- GDP-indexed targets would tend to be *regressive*. They would unavoidably be *dynamically regressive* in that they would penalise countries whose economies perform less well over time; countries in recession would see their emission allowances plummet, for example (Mueller et al. 2001). And there are arguments that it is economic growth that enables upgrading with new and more efficient capital stock. Flat-rate intensity targets would also appear to be *internationally regressive* in that developing countries tend to have higher intensities and, in the earlier stages of industrialisation, slower rates of intensity improvement.
- There are significant measurement issues: unlike emissions, GDP is a measure of human construction. There has already been ill-tempered debate about the possible impact of using market exchange rate measures of GDP in global scenarios, contrasted against purchasing power parity measures (Holtmark and Alfsen 2004). This hints at potential issues in how applying the GDP measure might make actual emission allocations vulnerable to issues of definition, currency fluctuations, or currency devaluations.
- The fourth question is whether GDP-indexed targets are compatible with the needs of an emissions trading regime for a “hard currency.” A tonne of carbon is the same unit, now or in the future. The emissions associated with a tonne of carbon per unit GDP will be contingent on future GDP. Yet, at the industrial level, emission agreements do frequently index allocations to physical units. Ellerman

14. In growing economies, any reduction will look bigger expressed in intensity terms. The US administration presumably saw a big political advantage in presenting a commitment to maintain something close to current trends as an “18% reduction in energy intensity.”

(2003) argues that it is perfectly plausible to convert such agreements into the “hard currency” needed for a trading system. The same conversion principles could apply in theory to GDP-indexed targets.

This last objection is, therefore, probably not in itself an insurmountable obstacle; the others may be.

Table 1. Options for defining national emission targets

Type of quantification	Fixed for period	Dynamic indexed
Usual reference point	Define relative to base-year emissions	Indexed on GDP growth (intensity change)
Other possible reference points	Define relative to: <ul style="list-style-type: none"> • base-year population • base-year GDP • decomposition hybrid (mix by sector, as in the Triptych approach) • cumulative basis (e.g., Brazilian) 	Indexed on population growth (per-capita change); or emissions relative to: <ul style="list-style-type: none"> • population (absolute per-capita) • GDP (absolute intensity) With transitional variants (e.g., per-capita convergence)
Options for target legal status		
<ul style="list-style-type: none"> • Binding • Price cap^a • Non-binding^b • Dual^c • One-way^d 	<ul style="list-style-type: none"> • Kyoto Protocol, first period, Annex B • UNFCCC “aim” for Annex I 	<ul style="list-style-type: none"> • US “clear skies” goal

^aAlso termed “hybrid” or “safety valve,” e.g., Bodansky, in Aldy et al. (2003). From a purely economic perspective, all binding agreements are “price capped” by the extent and cost of enforcement consequences, but the legal ramifications are different.

^bNon-binding can take a variety of degrees of commitment.

^cDual means a binding target, combined with a tighter target which would form a basis from which the country could sell into a trading system (Kim and Baumert 2002).

^dA one-way target is a single target against which a country could sell, but would not be held accountable if its emissions exceeded the target; it is equivalent to a dual target with the higher of the two emission levels exceeding plausible emissions.

Targets are generally assumed to be defined with reference to historical base-year emissions, though other reference points are possible. Both “fixed” and indexed targets, however, can be defined on other bases, including absolute bases (such as rights-based approaches to emissions per capita) that do not relate at all to base-year emissions. The proposal for “contraction and convergence,” technically speaking, is a transitional hybrid for moving from base-year “fixed” targets to equal per capita indexed targets over time. Note also that in the long-term context of Kyoto-like sequential negotiations, some of the features of indexed targets could be captured by “updating” the reference points of fixed targets in each negotiating round—which would almost certainly happen in practice.

In turn, emission targets can be of varied legal status. The strongest form is to make them legally binding and subject to enforcement measures, as with the EUETS and—in a slightly weakened form given the constraints of international law—in Kyoto. At the opposite extreme are explicitly non-binding targets as embodied in the original 1992 UNFCCC “aims,” which were largely unobserved.

The literature on target economics, and also on the politics of US engagement, gives considerable attention to price-capped binding targets. This has a number of potentially interesting properties but also raises difficult questions about implementation of a price cap and the use of revenues. Schlamadinger et al. (2001), for example, argue for price capping with revenues put towards avoided deforestation.

The literature on possible approaches for developing countries also considers “one-way” targets, under which they could sell into a trading system in the event of their emissions being below their target, but which would not be subject to any enforcement (or the need to buy) should their emissions exceed their target (IEA 2002). A variant is a “dual target,” which would also set a (higher) level that would act as a more traditional cap (Kim and Baumert 2002). Dual and one-way targets would respectively reduce and eliminate any risk of developing countries incurring net costs whilst giving them incentives to reduce emissions so as to sell into an international trading system.

In general, the academic literature has now scoped out these options fairly well. My own view is that for the developed market economies there is no strong basis for believing that any are superior to the legally-binding, absolute emission caps as embodied in the Kyoto Protocol and that form the easiest basis from which to guide emission policies and a trading system. If developing countries are to be engaged in negotiations on quantified national targets post-2012, the case can be made to consider a wider range of options, both in terms of the basis for quantification (e.g., there could be a stronger case for indexed targets concerning industrialising countries with more rapid but also more uncertain economic growth rates) and their legal status.

5.3. Sub-national and other approaches

In addition, there are numerous options for international agreements on a sub-national or (much less frequently) transboundary sectoral basis. The main options are classified in table 2, below. In principle, as instruments of international agreements, these options are likely to be less effective and less efficient than national emission target agreements, because they are less comprehensive in their coverage and give less national flexibility about how to implement the commitments. The complexities, limitations, and transaction costs of the Kyoto project mechanisms have now been widely experienced, and this leads to a search to move towards more aggregated mechanisms, notably possible ‘sector CDM’ agreements which would come close to sector-specific emission target agreements, but perhaps initially on a “one-way” basis—one step away from full engagement in sector-based cap-and-trade as now epitomized in the EUETS.

Whilst the options in the first three columns of table 2 still focus upon emissions, the final two columns cover agreements that define actions, not emissions directly. Because these give less flexibility, they have the potential to be politically more contentious, as well as less direct. The US has historically been extremely resistant to any agreements on specific domestic actions, seeing them as an international intrusion on its domestic legislative affairs. It has been keener on international cooperation agreements; the paradox being that these are generally ineffective without supporting domestic actions.

Table 2. Options for international agreements on sub-national, sectoral, and activity bases

Nature and coverage	Sector absolute emissions	Sector-indexed emissions	Project crediting	Domestic action agreements (PAMs) ^a	Cooperation and funding agreements
Options for reference point	<ul style="list-style-type: none"> • Relative to historical emissions • Relative to model-based projections 	<ul style="list-style-type: none"> • Indexed to physical production • Benchmarked to best practice 	Various baseline projection methodologies	E.g., <ul style="list-style-type: none"> • Subsidy reduction • Technology standards • Carbon taxation 	
Examples	EUETS “Sector CDM” proposals (absolute, one-way)	“Sector CDM” proposals (indexed, one-way)	Kyoto project mechanisms (JI, CDM)	<ul style="list-style-type: none"> • WTO tariff agreements and subsidies code • Kyoto Protocol, Article 2, (PAMs). 	<ul style="list-style-type: none"> • GEF^b and other funds • UNFCCC and Kyoto technology transfer and capacity building agreements • IEA Clean Technology Initiative

^aPolicies and measures.

^bGlobal Environment Facility.

Indeed, many of these options have already been explored in negotiations during the 1990s. Some did not lead far at all—the long and tortured history of negotiations on policies and measures that resulted in the oft-forgotten Article 2 of the Kyoto Protocol, for example (Grubb et al. 1999). Others delivered a bit more substance, albeit well below initial hopes, such as in the equally protracted negotiations on technology transfer and funding mechanisms. There may be a good case for extending agreements in several of these areas, and if the politics allow, the legal basis for strengthening such mechanisms already exists in the Kyoto Protocol (Article 2, on policies, measures, and general international cooperation; and Articles 10 and 11, which respectively address cooperation with developing countries on cooperative actions including technology transfer and funding mechanisms). It is hard to see any case for trying to re-invent these particular wheels from scratch.

It is clear, however, that whilst such mechanisms might facilitate a global response to climate change, as with technology-based approaches, they cannot on their own deliver credible solutions. Indeed, many of the more promising elements—such as sector-specific CDM and project mechanisms, as well as funding mechanisms—depend upon strengthened national-level commitments from industrialised countries. The point of this discussion is, rather, to show that the research community has delivered a large toolbox of possible instruments that could be adapted to national circumstances. The toolbox is sufficiently large and diverse that Sugiyama et al. (2004) suggest an “orchestra” of agreements for tackling climate change in the next phase. It is an appealing analogy, and it seems certain that to accommodate the diverse perspectives and concerns of the United States and developing countries, the

mix will need to be considerably broadened. The key questions are whether the political will exists to pick up the instruments; and whether and how any process can act as “conductor” to ensure that a meaningful tune emerges.

6. Political paths forward

At present, one question dominates the future of climate negotiations, namely, that of US engagement. It is hard to imagine the rest of the industrialised world proceeding to negotiate a new round of commitments without the United States, and it is even less believable that developing countries will talk about any enhanced actions whilst the world’s biggest and richest emitter remains outside.

It is easy, however, to mis-specify the nature of the US problem, or rather, problems. There are, at root, two fundamental issues. The first concerns the climate issue itself, where a combination of doubts about the seriousness of the problem and fears about the costs of emission limitations provide fertile ground for the political machinery in Washington to resist any serious emission reduction commitments. The second is the fundamental disconnect between US domestic debates and global realities, as manifest in the overall hostility of much of the Republican right to the United Nations, for example. It was the master strategy of lobbying by US industry groups in the early 1990s that connected the two and persuaded the US body politic that it should not adopt commitments without concurrent action by developing countries, whilst simultaneously lobbying developing countries to perceive any commitments as a threat to their economic growth. This twin-track strategy must rank as one of the most cynical, and successful, international lobbying campaigns in history.

It is important to note that neither of the two obstacles has much to do with instrument design. Suggestions that the US problem could be overcome by adopting intensity targets, for example, miss the point, except insofar as intensity targets could be used to dress up non-action with the appearance of action—a recipe which will not help to solve the climate problem.

The key, in contrast, is to understand in more depth the complexities and forces in the US domestic debate. Whilst partisan politics is an important feature, this also vastly oversimplifies the situation. It was authors for the heavily-Republican American Enterprise Institute that recently wrote (Stewart and Wiener 2003, 6): “The two most frequently heard options—join the Kyoto Protocol in essentially its current form now or stay out of any international agreement for the indefinite future—are both unsatisfying. Instead, we suggest a proactive but alternative approach: the US should engage China (and other major developing countries) in a parallel regime and then jointly seek to enter a suitably modified version of the Kyoto Protocol.”

One would not have to look hard to find writings from Democrat sources that took a far more fundamentalist anti-climate and anti-Kyoto line. And it is a well-known fact of US political history that some of the most radical U-turns have been under Republican second-term presidents. The outcome of the November 2004 US presidential elections will certainly have an important bearing upon political tactics. It could be a massive mistake to let it fundamentally dictate global strategy in tackling a century-long problem.

A more concrete political analysis is provided by Brewer (2003). Essentially, his analysis is that Bush's brusque rejection of Kyoto stimulated political forces in the United States that are not only starting to deliver more meaningful domestic actions, but that these will culminate in overwhelming pressures that will force the successor US administration, of either political persuasion, back to the global negotiating process—providing that one still exists. Christiansen (2003) is more cautious about the timing, but reaches the same basic conclusion of potential for substantial change.

The difficulty facing the strategy proposed by Stewart and Wiener (2003) is that it assumes that China and other major developing countries will be willing to work with the United States to form an alternate regime, which can then be merged with Kyoto. There is scant evidence for this. Having defined the climate change problem in terms of developing country participation, the United States has, in a curious way, made itself hostage to developing countries' demands about the terms of such engagement. And their first demand—persistent and consistent since the climate change issue first emerged onto the international stage—is that the United States gets its own house in order before expecting poorer and weaker countries to do so.

The overarching question is then whether climate change continues to be addressed under the United Nations. Sections of American society, far more vocal under the Bush administration, are fundamentally opposed to multilateral negotiations under the one-country, one-vote basis of the United Nations. The Bush administration's position on Kyoto is, to an important degree, a reflection of this; it has made no serious attempt to propose a multilateral alternative to Kyoto but has instead developed bilateral agreements on technology cooperation.

Conversely, Kyoto represents the culmination of ten years of negotiations under the United Nations, it clearly embodies the principles agreed in the UNFCCC, and is now formally backed by 125 countries that have ratified it—most of them after the US rejection. Even Russia's most virulent critic of the Kyoto Protocol acknowledged that Russia supports the Kyoto process, whilst still opposing specifics of the treaty itself.

In short, proposals to discard the basic Kyoto structure as the foundation for future action are equivalent to discarding the United Nations as the appropriate forum. Neither the United Nations, nor the rest of the world, has credible proposals for negotiations under the UN that do not build upon Kyoto's foundations. And for all the problems of the UN, abandoning it is a bridge too far. No one has seriously attempted to propose an alternative negotiating forum through which the world could solve this most global of all problems. Academic suggestions for bottom-up, "let flowers bloom" approaches overlook the fundamental political need for countries to be able to argue that they are "in it together." Anyone close to business knows that forward-looking industries want government to regulate emissions, so that they can make a business case for low-carbon investments. Observers of the political debates in the European Union, Japan, Russia, and Canada know that the biggest argument against delivering action is the non-participation of the United States. To argue that these countries would continue to act without any formal international framework guiding or guaranteeing anyone's participation stretches credibility.

That does not imply that all is well with the process itself. On the contrary, the UN negotiations had already become sterile and politicised before the US withdrawal, and much more thought needs to be devoted to the question of whether and how the process can be improved. As indicated, it is not wholly impossible that solutions could emerge on the back of some regional initiatives by major actors, though this looks very difficult; the US administration has lost any credibility on the issue, and the European Union has not yet been able to project a coherent and credible foreign policy that could galvanize global action on such a global issue. Relying on either carries huge risks and represents a fallback, not a strategy, in terms of tackling climate change. The procedures need reviewing, but UN negotiations remain the only credible “conductor.”

Four other things need to happen, however, before the “conductor” has much hope of getting the orchestra to produce a meaningful tune around the theme of post-2012 commitments.

First, the existing Kyoto Annex I Parties need to deliver on their current commitments. The widely-cited criticism of Barrett (2003) hinges heavily upon the claim that countries will not comply with their Kyoto commitments. His book is almost entirely based on economic perspectives and ignores many of the realities of international relations; also, his review in Aldy, Barrett, and Stavins (2003) acknowledges that, from such a perspective, compliance is a problem for almost all proposals to tackle climate change. Nevertheless, Barrett’s claim that emissions trading makes the regime particularly vulnerable to non-compliance remains to be tested and it highlights the importance of embodying a culture of compliance from the outset. If Kyoto is to deliver long-run goals, it must be clearly established that violating the commitments that underpin the whole system is not a tolerable option.

To the extent possible, commitment will need to be implemented with a balanced combination of domestic action and project-based international investments, with selective use of international trading to bring countries into compliance. This will be politically far easier to achieve if Kyoto is brought into force, and may be to a degree inextricably intertwined with that. Moving towards delivery, including through international trading, will increase the incentives for Russia to finally act rather than delay; whilst the politics of the EUETS allocation process has illustrated the difficulty of getting strong enough domestic action whilst Kyoto’s future is still perceived as uncertain. It is too late to unravel Kyoto, but further delay will do it further harm and increase the risks of non-compliance.

Second, the terms of engagement with the United States has to change fundamentally. This will be achieved not through tinkering with international architecture but through the gathering of domestic political forces in the United States, aided by progress elsewhere towards implementation. The US does not easily see itself as a laggard, and as one congressional aide put it, “the most powerful argument for action in the US is what the Europeans are now doing” (pers. comm.).

The modalities, however, require serious thought. There are fundamental reasons to do with US political structures why any US administration could find it hard to make and then deliver meaningful commitments. Konrad Von Moltke (pers. comm.) has argued that the United States should actually not be allowed back into the negotiations unless the administration first receives “fast track” authority from Congress to strike a deal. Should this prove impossible, another option, still more radical, could be to explore ways for the major US states to engage directly with the international process. They cannot sign

treaties, but they can engage in other forms of international agreements, including contracts on emissions trading, for example. Arguably, this could be a logical extension of observations in the social sciences about the growing international importance of sub-national actors (e.g., Kanie and Haas 2004).

The process of US transformation could be either aided or impeded by international progress on technology agreements: aided, if they increase engagement and understanding that technology programmes are part of the package for delivering emission reductions; or impeded, if they reinforce the US myth that technology development and cooperation in itself offers a credible alternative. In this context, growing interest in promoting a technology-based agreement under the forthcoming UK presidency of the G8 is a doubled-edged sword; the UK's presidency has every prospect of helping to lay the foundations for US re-entry, but in the face of a second Bush presidency, that goal could not itself be secured so quickly without jettisoning everything else that matters.

The third requirement is for a major re-orientation in developing country attitudes. At present, there is a deep-rooted perversity in the system: whilst industrialised countries struggle to present their still modest actions as big steps, developing country representatives at the United Nations seem almost wishing to hide the useful steps that many are taking anyway in domestic actions, lest this be seen to conflict with their rhetorical denial of responsibility to do anything. Some of the structural problems of developing country participation laid out by Gupta (1997) still apply and have yet to be addressed. Nevertheless, politically, the mystery to a northern observer remains as to why the collected might of the G77 countries seem to let themselves be led by a Saudi Arabian shepherd.¹⁵ The climate problem cannot be solved without action in and by the major developing countries, and they know it. Progress will be impossible until that fact is formally acknowledged and the developing countries move on to discuss what actions are appropriate.

Fourth and finally, the toolbox needs to be opened. It is not for any one author or article to propose which measures would be best matched to which groups of countries, and it is much too early to judge the potential political trade-offs. My own judgement remains that the core engine of post-2012 commitments would have to continue being absolute emission targets, for a somewhat enhanced set of industrialised countries, defined perhaps in more elaborate ways (over a longer period and/or with some price cap mechanism, for example). But to be politically feasible—and environmentally effective—these would have to be embedded in a far richer landscape of other commitments embracing at least one tier of developing countries, but possibly with several tiers of differentiation, or graduation mechanisms, regarding the nature as well as the degree of their commitments.

The toolbox for fashioning post-2012 commitments exists. If the world is to move on to the next stage of tackling climate change, the industrialised countries that have signed on to Kyoto need to deliver on their existing commitments, the basic negotiating process must be maintained, the domestic debate in the United States must either force the US administration back to the negotiating table or find ways to get around it, and the developing countries need to acknowledge their role. Then, and only then, can global negotiations start to pry open the toolbox.

15. The Group of 77 (G77) was established on June 15, 1964, by seventy-seven developing countries signatories of the "Joint Declaration of the Seventy-Seven Countries" issued at the end of the first session of the United Nations Conference on Trade and Development (UNCTAD) in Geneva.

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