Architectures for Agreement

Addressing Global Climate Change in the Post-Kyoto World

Edited by

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Policy analysts and diplomats worldwide are now focused on the design of the regime that could replace or extend the Kyoto Protocol in 2012 when the Protocol’s main commitments expire. While the Kyoto Protocol has several achievements to its credit – in particular, it has played a role in sustaining political attention on the need for policies to control emissions of the gases that cause global warming – in many respects the Protocol is in deep trouble. In Australia, Canada, and the United States – three countries where the Kyoto commitments would have been most demanding – governments have largely abandoned the treaty. In Japan and Europe governments are implementing some limits on emissions, but much effort is now focused on a shell game of accounting that will probably yield formal legal compliance with the treaty’s strictures through the trading of credits that do not reflect actual reductions in emissions. The Russian government nearly abandoned the treaty for fear that it would actually require changes in behavior. The integrated international market for emissions envisioned under the Protocol has not yet materialized; instead, at least six different carbon markets have emerged – each with their own rules and prices. The Clean Development Mechanism (CDM), a scheme intended to engage developing countries by subsidizing projects that would allow them to build less-carbon-intensive energy systems, is tied in red tape that will be familiar to any student of the US Environmental Protection Agency’s limited emission trading system.
programs – notably the offsets program – of the 1970s (Hahn and Hester 1989). Most of the pipeline of CDM projects is dominated by schemes to achieve largely false credit for reductions in industrial gases; energy projects account for just 17 percent of the effort (Wara 2006). And while nobody thought that the Protocol would be the final word in efforts to control emissions, it is hard to see that it is even the first word in a viable framework for the future.

This paper suggests an alternative framework. I proceed by examining the four key elements of the Kyoto architecture: universal participation, binding targets and timetables for emissions of greenhouse gases (GHGs), integrated international emission trading, and compensation to encourage participation by developing countries. For Kyoto’s enthusiasts these four elements are the bedrock of the Kyoto system and, by their account, must be replicated in any future climate treaty.

My argument is that Kyoto’s troubles are rooted in these four elements of conventional wisdom. The patient followed the doctor’s orders scrupulously, and by that regimen he has incapacitated himself. I make this argument in the first part of this essay.

The second part of the essay offers an alternative vision that is based on more extensive use of nonbinding agreements among smaller groups of important countries, allowance for fragmented emission trading systems, and new mechanisms for engaging developing countries. Throughout, my argument rests on the broad argument that serious action to address climate change must be anchored in capable institutions. And the most capable institutions exist at the level of nation-states (and some regions, notably the European Union). International institutions – especially global institutions rooted in the United Nations – are relatively weak. They play important roles as codifiers, coordinators, attractors of attention, and suppliers of a few collective goods. Too much attention has focused on the global institutions and not enough on the more diverse national and regional bodies that actually get things done. This mismatch between diplomatic focus and real action explains much of Kyoto’s trouble, and it explains why the architecture that I advance makes much heavier use of the institutions that are intrinsically more capable than global binding treaties. It also explains why my approach is more fragmented, as that reflects the reality of how authority is allocated in the international system. Carbon markets are likely to be fragmented rather than integrated – a
world that is second best in theory but first best when the theories are updated to reflect how property rights can be assigned, monitored and enforced.

**Conventional wisdoms**

Global warming is perhaps the most difficult problem to be confronted within in the international system. It is caused by a large number of countries (Figure 4.1) with highly diverging interests – some (mainly the industrialized world) want action to control emissions and are willing to pay for it. Others (mainly in the developing world) are willing to accept action if others pay for it. Because countries enjoy a broad freedom of action in their international affairs, collective action is especially difficult to achieve because every participant must see that it benefits individually from the joint effort. As with most common pool resources, the incentives to defect are strong – especially as enforcement is difficult and governments have strong incentives not to honor their commitments. Furthermore, while the benefits of action accruing far in the future in the form of a lighter footprint on the world’s climate system, the costs begin to accrue today. Achieving deep cuts in the emissions of these gases implies a radical reorganization of the world’s energy systems and perhaps key elements of the world economy – a journey that one does not begin on a whim. With all these obstacles, it is not surprising that effective action has been a long time coming.

The Kyoto framework, ironically, is designed in a way that seems to maximize the difficulties in collective action. These difficulties are evident in all four of Kyoto’s main architectural features – universal participation, binding targets and timetables for emissions of greenhouse gases, integrated international emission trading, and compensation to encourage participation by developing countries. I address each in turn – and for each I criticize the conventional wisdom and suggest some alternatives.

**Universal participation**

The standard argument for universal participation is that it creates legitimacy and avoids “leakage.” The former is a woolly concept that has not been subjected to careful empirical tests. The legitimacy that
comes from giving all nations a voice is probably overrated in importance. Indeed, most of the world’s effective international institutions began with large doses of discrimination and inequality – they include the GATT, the IMF, the UN Security Council, and the G8.

Economists have focused, instead, on the problem of “leakage” – the phenomenon that tight regulations on some countries will cause industrial activities to migrate (“leak”) elsewhere in the world where regulations are lax. For any aggressive climate control regime, leakage is clearly a problem that demands attention. But if we assume that the first few decades of efforts to control emissions will be marked by modesty, learning, and innovation – hardly the hallmarks of aggression – then the problem of leakage becomes much less severe. Indeed, research on the “leakage” hypothesis done two decades ago when there were large concerns about industrial flight due to differences in environmental regulation show that such fears are largely overblown (e.g., Low 1992). Indeed, economics is probably poised to overstate the leakage problem because it analyzes these issues using equilibrium models that already do not reflect the huge variation across borders in the factors that affect industrial location (not least, the huge variation in retail energy prices), and analysts who focus on carbon policy tend to imagine that most industrial decisions are driven by such policies when in reality they are not. Already there is a substantial ($20–30 per ton CO$_2$) difference in carbon costs between the USA and EU with no evidence that this is affecting industrial decisions. In short, the benefit of paying close attention to “leakage” does not seem to be large.

The costs of efforts to address leakage, however, are substantial. Leakage-inspired agreements that include all major contributors necessarily include countries that have quite different interests. As evident in Figure 4.1, for example, the top emitters include Organisation of Economic Co-operation and Development (OECD) nations (notably the EU but also, to a lesser degree, the USA) that generally favor some emission controls. They also include countries (e.g., China) that reject any limits. And they include countries (e.g., Russia) that might actually perceive benefit from climate change and thus could have a special interest in undermining effective emission controls. Such dispersion in interests is hardly a new problem in international affairs, and much of the process of negotiating effective agreements is one of adjusting terms and geometry to find a Pareto-improving bargain. If concerns about leakage dominate those negotiations – and thus membership is
high – it becomes increasingly difficult to assemble the subtle package deals that are needed to ensure Pareto-improvement.1

Binding targets and timetables

A second area of conventional wisdom lies in the types of commitments that are selected and the way that they are codified. The common

1 For the same reasons, efforts to build an international regime to control climate change on a shared “objective” are likely to fail because countries in fact do not have shared assessments of the danger and opportunity. Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC) lays out exactly that objective (it calls for avoiding “dangerous anthropogenic interference in the climate system”), and considerable diplomatic and scientific effort has focused on putting Article 2 into practice. Those efforts are built on an unrealistic vision of politics. It is perhaps understandable that diplomats, whose job description includes the manufacture of a seemingly logical order to what is in fact a highly political process of sausage making, would create something like Article 2; why sober analysts would devote so much attention to the impossible task of actually assessing the true meaning of Article 2 is mystifying.
The assumption is that legally binding instruments are best because governments take those most seriously. Because such instruments are formally binding they are usually negotiated by diplomats—especially diplomats with legal training. And for pollution problems, the conventional wisdom holds that the best kinds of commitments are “output” measures—that is, targets and timetables for emissions—rather than “input” measures such as the effort or policies that each country will pursue. Output measures, it is thought, assure that governments will not slack off; if they are held accountable for a particular level of pollution then the environment will be protected best. Again, the evidence for these propositions is scant.

The assumption that binding instruments are best is part of the folklore of global environmental law, for which treaties are assumed to hold a prized place. In reality, the decision about legal status is just one of several design choices that affect outcomes. I will concentrate on the interplay between legal status and another critical design choice—the style of diplomacy. As shown in Table 4.1, diplomatic style can involve professional diplomats (usually lawyers) who specialize in negotiating texts with an eye to compliance. Alternatively, negotiations can occur at the level of senior political leaders who make aspirational commitments, often without an eye to the particulars of compliance.

**Table 4.1 Level of participation and legal status of commitments**

<table>
<thead>
<tr>
<th>Style of negotiation</th>
<th>Diplomats, lawyers, and bureaucrats</th>
</tr>
</thead>
</table>
| **Senior politicians** | Nonbinding | • North Sea pollution  
| | | • Tokyo Round “codes”  
| | Binding | • Arms control treaties  
| | | • Whaling  
| | | • Montreal Protocol  
| | | • Kyoto  
| | **Nonbinding** | • Technical standards groups (e.g., Codex)  

Most of the canon of international environmental law is based on the lower-right cell of the matrix in Table 4.1. But all four of the cells offer relevant experiences. In general, instruments in the lower-right cell work best when it is clear how to comply with commitments and
when locking countries into place is of special importance. By contrast, instruments in the upper-left cell – nonbinding agreements crafted by accountable political leaders – work best when the purpose of an international agreement is to signal a direction for effort but it is unclear exactly what the effort will cost and whether it is politically or technically achievable. Nonbinding political agreements (upper-left cell) are more flexible and less prone to raise concerns about noncompliance, and thus they allow governments to adopt ambitious targets and far-ranging commitments. In contrast, binding legalistic agreements (lower-right cell) are usually crafted to assure compliance – especially when the agreement includes countries whose internal legal procedures assure that international commitments are enforceable such as through direct application in domestic law. A binding commitment might be useful for codifying an effort that is already in hand (or which requires actions that are easy for governments to deliver). But uncertain, strenuous efforts at cooperation are easier to organize when the commitments are not formally binding.

In addition to trade-offs on these two dimensions – accountability and legal status – there is also a third dimension of choice, which I will call the measure of accountability. Commitments that are set in terms of outputs usually work best when there is a clear chain of causation that links actions by governments (who are usually the actors that subscribe to international commitments) and the ultimate output of pollution. Classic arms control agreements usually had terms set in outputs (e.g., number of missiles) because governments were confident that they could control their own behavior. Similarly, the agreements on the ozone layer were expressed in outputs (consumption of ozone-depleting substances) because the limited number of industrial firms and strong mechanisms for regulation made it possible to control production and trade and thus assure compliance. By contrast, the global warming problem is marked by extreme difficulty in connecting government actions to particular outputs (emissions) because the factors that determine are largely outside the near-term control of governments, such as the state of the economy and technology and investment decisions by firms. Governments can solve this problem by capping emissions – such as through an emission trading program – but only by accepting large uncertainties in the cost of compliance. As those uncertainties rise so does the credibility of the commitments since a program that is excessively costly will raise the risk that that country
will simply abandon its commitment – as the United States did with its Kyoto commitments in 2001 and as Canada is doing now in 2006. Such policy choices about regulatory instruments – whether outputs or, alternatively, a specified level or type of effort – are familiar to students of the “prices vs. quantities” literature in economics (e.g., Weitzman 1974; Roberts and Spence 1976; Pizer 1998).

These trade-offs are evident in the case histories of lesser-known experiences with controlling environmental pollution where architects actually deployed decision-making procedures, legal agreements, and regulatory instruments that differ from the conventional wisdom. The experience with international cooperation in the North Sea, the Baltic Sea, and with acid rain in Europe are all examples where nonbinding instruments backed by senior politicians proved to be more effective than binding alternatives (Roginko 1998; Skjærseth 1998; Wettestad 1998). In those cases, there had been efforts to use binding instruments to address the problems at hand, but those efforts often fell short. In the North Sea and Baltic Sea regimes, the addition of ministerial-level conferences that included ambitious (but nonbinding commitments) helped, in part, to break the logjam. In the European acid rain regime, more-ambitious nonbinding commitments to control NO\(_x\) (a leading cause of acid rain) were adopted by a smaller number of countries alongside a binding convention to address the same pollutant. In all three of these cases the nonbinding efforts alone did not lead to more effective cooperation. Rather, at least three elements were necessary for effectiveness. First, the commitments required high-level attention – usually at ministerial level – to improve accountability and implementation. Second, the nonbinding commitments worked because they were embedded within institutions that could mobilize detailed performance reviews, which are especially important when commitments concern areas of activity where it is difficult to gauge the best implementation strategies at the outset. In the North Sea and Baltic Sea regimes, notably, the nonbinding commitments along with extensive review helped to focus attention and effort on the difficult-to-manage problem of land-based pollution runoff. Third, the commitments and review should be part of an ongoing relationship so that the shadow of future interactions (and linkages across issues) impose discipline on current behavior.

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2 See also generally Victor, Raustiala, and Skolnikoff (1998).
Integrated emission trading

Having embraced the earlier elements of conventional wisdom – global participation and binding targets for emission outputs – a relatively small step of logic is needed to arrive at the third pillar of conventional wisdom: integrated global emission trading. So long as governments worldwide are involved in the effort to control emissions, it is best to use a flexible market-based system to ensure that the costs are as low as possible. The logic for this position is sound, but its application in the international system is problematic for at least three reasons. One set of reasons relate to all that is said above – namely, the other elements of conventional wisdom that lead to emission trading are not robust under scrutiny.

A second problem with emission trading relates to allocation of emission credits, which is particularly difficult when regulating gases such as carbon dioxide at the global level. Where membership rules allow for unit veto and some countries are risk-averse (i.e., the developing countries, Russia, and others who don’t see a strong interest in controlling emissions), allocations are prone to padding. Government officials from these reluctant countries arrive at a negotiation with a brief to incur no cost, and they know that the treaty will be rejected back at home if it is seen to violate this maxim. So they imagine their worst-case scenario for emissions and they demand an allocation equal to (or higher than) that level. That is what Russia did in Kyoto; that’s what the developing countries will do when they are forced to accept emission targets. Since nobody knows the countries’ true levels of future emissions, each new entrant to this negotiation makes it harder to gain a meaningful agreement on the total size of the pie and its allocation. Elsewhere I have called this problem “negative sum bargaining” (Victor 2001). Ironically, as the system is expanded – so that gains from trade are largest and so that leakage is minimized – the very process of expansion undermines the ability of the scheme to impose a meaningful limit on emissions.

This problem is hard enough to address, but the international institutions within which binding allocations of emission credits would be negotiated are structurally weak and are marked by long delays between agreement and implementation. As in Kyoto, a long time passes from the point of negotiation (in that case, 1997, with negotiations constrained by the decisions of 1997 dragging on to 2001) and the
actual implementation (2008 to 2012). During this delay, errors in forecasting grow; many of those errors magnify the financial flows that will arise when the emission trading system begins to equilibrate. Many analysts have called for even longer time horizons because an optimal response to the challenge of managing carbon requires a long-term approach; that call is logically sound yet practically troublesome because it would magnify the likely financial imbalances that would arise as the trading system equilibrates. These imbalances matter because if they create political trouble in just one (or a few) countries then the pressure to defect will grow and the deterrent against defection is quite weak. As that one country exits the system then the financial imbalances and burdens will shift and that will put pressure on other countries. I find it striking to compare this system with the early days of the GATT. In an emission trading system, errors in allocation of emission credits or the exit of one country creates instabilities that magnify the pressure for others to exit; in the early days of the GATT, the reciprocal and therefore self-enforcing nature of tariff concessions created pressures that magnified the benefit of remaining within the regime.

None of this means that international trading mechanisms are completely infeasible. It does mean, however, that they rest on a much more fragile basis than is conventionally thought – because the process of allocation will be extremely sensitive to underlying interests, and because the operation of the market will be sensitive to the capabilities of the institutions that oversee and enforce the trading system. For the most part, studies of international trading have not looked at these issues. Rather, they have treated states as black boxes – emission credits would be allocated to governments (itself a Herculean task) and then governments would establish the internal procedures needed to make their markets work. A rich literature has arisen around efforts by governments to put those internal procedures into effect, but so far there is strikingly little connection between that “domestic” literature and the thinking about international emissions markets. Putting those two strands together requires looking carefully at how real governments implement emission trading systems. When that is done, we find that the internal characteristics of states are extremely important – they are perhaps the dominant reason why international trading systems are likely to be fragmented even as there are strong economic incentives for integration.

3 Among the few exceptions is Hahn and Stavins 1999.
The internal characteristics of states will influence trading in at least two ways. First, the national economy might not be organized around market principles, and thus there might be rampant inefficiencies that already affect the economy. Thus, even if governments (or individual enterprises) are forced to trade emission credits, they might not focus their efforts on the least-cost way to control emissions. In China, for example, large central coal-fired generators get their capital from central allocations at nearly zero cost. By contrast, gas-fired generators pay something closer to the real cost of capital – in part because gas is not an incumbent industry and in part because both the equipment and some of the gas is priced on international markets. In these settings it will be a lot less costly and more effective to focus on the underlying market failures – such as pursuing capital reforms and sundry other tasks that are core to the Chinese project for economic reform – rather than allocating emission credits.4

Second, national regulatory institutions might not have the administrative capabilities to implement an emission trading system. For a trading system to work it is necessary to allocate credits to the institutions that actually govern decisions about technology and behavior, which in nearly every economy is a large number of mainly energy enterprises. Making a trading system work requires, then, the capacity to monitor the behavior of these enterprises and to enforce compliance. Those are not easy tasks. They are akin to what Western governments have had to do when overseeing banking regulation – an area where even highly capable governments have failed, such as the United States did with the savings and loan crisis. An international trading system implies that these functions would be performed with similar competence across all the jurisdictions that are part of the trading system. The closest analogy is perhaps Europe’s efforts at creating the European

4 There is a tendency among Western analysts to assume that such problems do not affect the more market-oriented economies of the OECD. While that assumption is probably generally true, there are some specific instances that reveal how much additional reform is still needed. For example, lignite-fired power plants in Germany receive allocations under the EU Emission Trading Scheme (ETS) that are equal to their expected emissions. And a growing number of European analysts expect that allocations will be reset every five years, which means that so long as the lignite lobby stays strong it can probably count on special allocations. In that world, political incentives favor building lignite power plants (despite their high CO₂ emissions), and the practical effect of the emissions markets is severely hobbled.
Monetary Union (EMU); indeed, the analogy with a currency is apt since, in effect, the creation of integrated and demanding emission trading systems is not much different from creating a common currency. It is sobering to see how difficult this has been for Europe, despite having a long history of cooperation, strong common institutions and trading relationships, and even a common central bank. It took many years to build the necessary institutions. Even then, when enforcement proved inconvenient for politically powerful members – such as Germany and France, both of which have violated the EMU’s deficit rules – the strictures were never applied fully. Those difficulties should be a warning about how rapidly we could expect a common international carbon currency to arise (Victor and House 2004).

These two characteristics – an efficient market-oriented organization of the broader economy and the capacity to administer an emission trading system (e.g., allocation of permits, monitoring and enforcement) – appear to be highly correlated. That’s no accident since a market-oriented economy demands that government develop the capacity to intervene through regulation and market surveillance rather than through direct control. For the most part, markets emerge only where government has developed the capacity to act at arm’s length. These characteristics are also highly correlated with willingness to pay for controlling emissions. In general, it is rich and highly industrialized market-oriented economies with capable governments that are most concerned about climate change.

These correlations tell us something about how emission trading is likely to emerge. There is a “zone” of countries that have the will and capability to create meaningful emission markets. These countries all have intense trading and investment relationships with each other. Their institutions tend to recognize each other – even to the point of allowing extraterritorial application of law. For these countries it is a relatively small step to imagine that they would extend their trading relationships to include a nascent currency of tradable emission credits. What defines the zone, however, is not their common interest in controlling emissions – indeed, their interests vary considerably as is evident when comparing the domestic policies in the EU, United States and Australia – but rather their institutional capabilities and the extent to which other members in the zone are confident of those capabilities.

I borrow the term “zone” from Anne-Marie Slaughter’s work on the “zone of law” – a concept she developed to explain why some courts
recognize the jurisdiction and decision of other courts while others do not (Slaughter 1992). Her argument was that a “zone of law” existed where courts engaged in such mutual recognition for countries where courts were confident that the judiciary followed certain core tenets, such as independence of judges. On the strength of that zone of law, various other elements of mutual recognition usually also arose – for example, limited forms of regulatory cooperation. By contrast, such systems of mutual recognition were much more difficult to craft with countries that were outside the zone.

Thus, what is likely to occur is not an integrated international emission trading system but, rather, a series of fragmented markets. Indeed, real carbon markets are emerging in this manner (Figure 4.2). These markets are most active in countries where political interest in regulation is the greatest – today, the European Union. Thinner markets with weaker rules – such as the Chicago Climate Exchange – have arisen in markets where political interests and regulatory effort are weaker (Victor, House, and Joy 2005).

Europe’s ETS has been most successful and provides insights into the challenging logistics of market implementation. The EU ETS entered into force on January 1, 2005 as a response to the Kyoto Protocol’s

![Figure 4.2. Traded carbon prices and volumes](image-url)
GHG emissions reductions targets. The scheme caps GHG emissions from about 11,500 power and industrial installations across twenty-five countries and six major industrial sectors. These installations account for roughly 45 percent of the EU’s CO₂ emissions (Nicholls 2005). Emissions are allocated within nations via National Allocation Plans (NAPs). Brussels exerts some discipline on the NAPs through the application of common standards – for example, rules that prevent national governments from allocating permits in ways that favor national industries at the expense of foreign companies. It is nonetheless revealing that the permits, for the most part, are not auctioned – indeed, there are caps on the fraction that governments would be allowed to auction. During the first phase of the ETS (2005–2007), 5 percent of a nation’s permits may be auctioned, while 10 percent may be auctioned in the second phase (2008–2012). These are free new assets and, not surprisingly, the NAPs have been highly politicized and rife with problems.

A 2005 WWF study found that the incentive structures of the NAPs of Europe’s six largest economies favored those new plants that burn coal over those that use natural gas (ILEX Energy Consulting 2005). This perversion exists where allocations are distributed based on installments’ economic need rather than on environmental targets. For example, grandfathering provisions in Germany’s NAP give coal-fired plants a competitive advantage over gas-fired plants.

Much has been written about the ETS’s strong provisions for monitoring and enforcement. Indeed, those provisions are noteworthy. My view, however, is that the critical mechanism in the ETS is the “linking directive” – the set of rules that govern where and how credits can be allocated.

Thus far the ETS has had little monitoring and enforcement experience, as the scheme is still in its early stages. The basic approach, however, is quite clear and likely to be effective. Emissions of installations that fall under the scheme are monitored under EU guidelines and primarily through records of fuel purchases. Self-reported emissions must be audited by an independent third party. The EU ETS enforcement mechanism consists of a series of fines for noncompliance (€40/TCO₂ during phase one, and €100/TCO₂ from 2008 onward). Installations must make up their missed emission reductions during the next year – thus the fines are not a safety valve (in fact, they work in the opposite fashion by amplifying price spikes rather than dampening them). If permit prices begin to approach the fine level, it seems likely that there will be a political intervention to adjust the system as it is hard to imagine that European industry would tolerate such a burden when their competitors face, in effect, a zero price on carbon.
imported from other jurisdictions – notably the developing countries (CDM) and the countries in transition (JI [Joint Implementation]). The most efficient outcome would eliminate the linking directive and allow European firms to acquire Kyoto-valid permits anywhere in the world. Under that scenario, the price would drop from the high levels (shown in Figure 4.2) to something between $3 (roughly transaction costs) and perhaps $5 or $7. Instead, the linking directive erects a wall around Europe, with Brussels and the member states controlling how wide the doors in the wall are opened to the outside world. The very concept of trading has been inverted from its original goals. In the areas where the gains from trade are least – that is, within the EU – trading is relatively unfettered. Across the jurisdictions where the gains from trade would be the greatest – that is, from within the “zone” to the outside – the rules that limit trading are most onerous. Many observers view this as a political compromise that was necessary to placate Greens who demanded visible pain (in the form of higher prices for carboniferous energy) and thus sacrifice.

I suggest that this also reflects the nature of the institutions that are necessary for implementing a trading system. Indeed, we should expect fragmented trading systems to arise everywhere else as governments start to tackle the climate problem. That future landscape will be dominated by multiple prices, a proliferation of barriers against trading, and eventually the slow emergence of integrated systems only within the “zone” – that is, where governments have confidence in each other’s institutions and level of effort. If we think about trading as the creation of a common currency then the root cause of this outcome is quite clear – governments want to avoid a “Gresham’s Law for greenhouse gases,” and they are willing to honor (in the form of mutual exchange) emission credits only from jurisdictions that have the institutional capacity and record of commitment that is necessary to assure that they aren’t simply printing money.

This process of evolution might take a long time – perhaps a generation, maybe longer – even within the zone. That’s because each country is likely to implement its trading system with an eye to its own procedures, capabilities, and political economy. Thus the EU system gives prominence to the national member governments and their NAPs, and because of the long history of Brussels’ regulation of large industrial sources, it focuses especially on just the 45 percent of emissions that comes from those sources. The US system might be more
broad-based. If the US system includes a safety valve, then troubles will arise for trading across the Atlantic if the US valve is set at a level that is much lower than the EU’s price cap. (That outcome is highly likely.) Japan’s trading system, if it exists at all, will arise within an industrial organization that is much more highly regulated – it is unclear if prices will really matter in that system, and that will be a source of tension and opportunity if a Japanese system becomes stitched together with the EU or US system.

Compensation for developing countries

The fourth part of the conventional wisdom is that developing countries will participate only if they are paid. The logic for this position is sound – developing countries generally place a low priority on slowing global warming when compared with more urgent priorities, and they are wary about committing resources when the industrialized countries have not done much on their own. The result of this logic is the Kyoto Protocol’s CDM.

Politically, a large CDM has become necessary because the CDM has been offered as the main instrument for engaging the developing countries. If that mechanism offered nothing for those nations, then the task of convincing these governments would be much tougher in the future. Even so, most of the CDM projects have concentrated in a handful of countries that have organized themselves well to process CDM applications efficiently and are also generally attractive places to invest in the developing world – these include India, China, South Africa, and Brazil. Most of the rest of the countries have fared much worse, and the political overtones that bedevil the CDM are evident in the recent efforts to re-jigger CDM investments so that more of the money flows to the rest. Another main political driver for a large CDM, however, is Europe’s desperation. On current trajectories the EU will not meet its Kyoto targets, which is a politically unacceptable outcome. Nor is it acceptable to open the doors through the ETS wall to all forms of JI projects from the transition countries, notably Russia – as most of those projects are seen as “hot air.” So the CDM is the only way to make the books balance. As investors have seen that arithmetic unfold, they have scrambled to develop CDM projects that have the most sure-fire chance of approval and can be imported into the ETS most quickly. As soon as the ETS shortfall is fully saturated, the CDM market is likely to stagnate.
In addition to the political story, it appears that the important substantive story about CDM is that actual project pipeline is very different from what was imagined when the CDM was invented in the months leading to the final negotiations in Kyoto. It has not become an instrument for large-scale investment in clean energy systems in developing countries – such projects, in fact, account for just a few percent of the total credits in CDM pipeline. Some 65 percent of the credits come from two industrial gases (HFC-23, a byproduct in the manufacture of refrigerant HCFC-22, and N$_2$O, a byproduct in the manufacture of adipic acid that is used for making nylon). Perhaps half of these reductions are actually the result of accounting tricks, and if the purpose of CDM is to target a subsidy for emission cuts in developing countries then it has become a highly inefficient mechanism. The projects that are reducing emissions of HFC-23 cost in total about $70m, and the value of the subsidy being provided through CDM is about $1 billion. Yet the various rigidities that exist inside the CDM and its main market (the ETS) provide very strong incentives not to rock the boat. The EU needs the credits to assure compliance with its Kyoto commitments. The main developing countries that host the projects welcome the money and investment. The traders gain from trading volumes. And for the environmentalists it is politically tricky to attack the only mechanism that exists to engage the developing countries. With these powerful forces at work, the CDM apparatus could continue for some time. Some efforts are under way to reform the CDM, but such offset systems fundamentally are prone to fail because they require the technically and politically impossible task of making a baseline assessment – that is, the level of CDM credit must be assessed as the reduction below some baseline. Thus projects that are intrinsically marginal gain favor (e.g., industrial gases that are destroyed by special equipment bolted to the end of a pipe), while projects that actually put countries on different development pathways are impossible to credit because it is impossible to determine ex ante the carbon emission profile of a whole country.

**Toward a new architecture**

So far I have suggested that the existing climate change architecture suffers, at least partly, because it has embraced conventional wisdoms

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6 The analysis of the CDM pipeline is based heavily on Wara 2006.
that do not apply to the case of climate change. In part, a better architecture for addressing the climate issue would begin by adopting alternatives to these conventional wisdoms. In this section I focus on how that architecture might be constituted.

From the discussion of conventional wisdoms it is clear that a new architecture for addressing the climate problem must have at least three features. First, it must allow for variable geometry of participation. In particular, it must allow discrimination so that the most serious negotiating efforts can concentrate on the countries whose participation matters most. That criterion probably means that none of the existing global institutions, including notably the UN, would suffice. Such institutions are usually built on principles of universal participation; discrimination is particularly difficult in such settings.

Second, the architecture must allow for a variety of efforts that are tailored to each key member’s capabilities and interests—rather than a single integrated system within which all members must adopt similar instruments. In particular, the system must include a mechanism that entices the participation of developing countries.

Third, the institution must offer a framework within which ambitious political commitments can be made while offering sufficient accountability so that commitments become connected to action. This standard will be the toughest to satisfy, for it raises the questions of enforcement and accountability that are most difficult for international institutions to address.

There are no easy solutions for meeting these criteria. However, it is encouraging to see that, in history, there are several examples of this type of cooperation. The best examples come from economic cooperation—such as trade, monetary, and development policies—not from issues that are classically thought to be “environmental.” Part of the trouble in designing an effective response to the problem of climate change may be that the tools for collective action that have been applied are drawn too much from the environmental experience—in particular, the cases of environmental cooperation marked by relatively low levels of uncertainty in the ability of governments to implement their commitments and relative ease in assembling packages of Pareto-improving commitments (Victor and Coben 2005). Such cases tend to favor the kinds of instruments (e.g., emission targets and timetables) and negotiating processes (e.g., binding regulatory conventions) that have been applied in Kyoto. Conceptualizing the climate change
issue as one of economic cooperation might help to mobilize attention to better precedents.

Among the precedents from economic cooperation, perhaps the most effective example is the World Trade Organization (WTO). That regime for cooperation began by focusing, through the original GATT, on a limited number of countries whose interests (and capabilities) were sufficiently aligned to allow gains from cooperation. Over time, experience and success have allowed deeper and wider cooperation (and also led to negotiations that extend over much longer time periods because they are more complex). Widening and deepening occurred at the same time, rather than in sequential order. The GATT round that ended in the early 1990s with the creation of the WTO has included much more than simply the tariff bindings that were the core of the first GATT agreement. Similarly, the EU emerged from a more focused cooperation (on infrastructures and key commodities such as coal and steel) among a limited number of countries. With experience and the confidence of success the EU has expanded and deepened. The recent expansion to include twelve new countries, and the agenda for talks with Turkey, may test the limits of EU expansion. Both of these cases – the WTO and the EU – are examples of successful cooperation emerging within a regime of variable geometry and through practical efforts that, with time and effort, became stitched together into a more integrated system. In both these cases, cooperation was forged not mainly through “top-down” central institutions but through packages of proposals that each individual country offered. Collective agreements were forged through negotiations around the adequacy of those packages. Mechanisms for peer review, coupled (eventually) with central institutions such as the WTO’s dispute resolution mechanism and the European Court of Justice, helped to ensure that the collective effort had integrity. Elsewhere, I have called this cooperation from the “bottom up” – that is, cooperation steered by common institutions but rooted, fundamentally, on practical actions implemented by key countries and jurisdictions (Victor 2004). The two examples cited here are not the only ones. Tom Schelling (this volume) has suggested that NATO budget allocations and the Marshall Plan are good precedents. Chayes and Chayes (1991) have noted that the process of negotiating Article IV exceptions within the IMF also offers a model marked by individual countries proposing packages of measures and then subjecting themselves to periodic scrutiny to probe whether the packages are sufficient and being implemented to plan.
What would this mean for the design of an effective regime to address climate change? The key is to craft an institution that allows for variable geometry and effort. That probably cannot emerge within the UNFCCC process because that institution, rooted in the UN, is too large and inclusive. The UNFCCC could play a role in this process as the main global forum for addressing climate issues, but as efforts become serious and negotiations complex, it is hard to see that a universal forum can be the only mechanism.

The most interesting idea for a new institution is former Canadian Prime Minister Paul Martin’s concept for a forum of leaders from the twenty key countries (L20). Martin (2005) has offered a general vision; a series of meetings have applied the concept to major issues in world affairs, including climate change and energy (www.l20.org). Whether by creation of a new institution such as the L20 or reform of an existing forum such as the G8, such a standing body would offer a way to craft deals among the smaller number of countries that matters most. The exact membership of this institution might, in practice, depend on a variety of factors not simply emissions (e.g., see the ranking in Table 4.2). For example, if the G8 occupied this role then the most likely membership would be the “G8 + 5” – that is the five additional countries (Brazil, China, India, Mexico, and South Africa) that have become semi-permanent fixtures of G8 meetings although not yet formal members. That arrangement would tend to elevate Brazil’s importance relative to its emissions of carbon dioxide from fossil fuels while excluding other big emitters such as South Korea or Iran. While Brazil’s industrial emissions are relatively small due to the large role for hydropower in that country, Brazil is important nonetheless because of its role in tropical forestry. (By the same logic, however, Indonesia and Malaysia are both very important – yet excluded from the G8 + 5 group.) There is probably no magical formula that will instruct the proper membership of the club of greenhouse emitters, but what matters most is that the club be small enough to be functional.

Small size matters because the style of negotiating collective agreements will be very demanding. As with GATT/WTO “rounds,” each country could propose its own package of policies and measures that

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7 It should be noted that Brazil’s emissions estimates might be revised upward as more is learned about the large emissions of greenhouse gases from tropical dams. For a review of the issues and citations to the main literature, see Cullenward and Victor (2006).
would constitute its contribution to the collective effort. In the case of climate change, most countries that are keen to control emissions probably would propose some combination of emission caps or taxes. Some, however, might decide to propose alternatives that are better suited to their regulatory and political environment. The EU, for example, is attempting to meet its Kyoto commitments through a combination of emission caps and trading for the industrial sector and other regulatory

Table 4.2 Top emitters

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>2002 CO₂ emissions (1,000s of metric tons)</th>
<th>% total 2002 world emissions</th>
<th>Cumulative % total 2002 world emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>United States</td>
<td>5,838,118</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>EU25</td>
<td>3,674,876</td>
<td>15</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>China</td>
<td>3,513,103</td>
<td>15</td>
<td>54</td>
</tr>
<tr>
<td>4</td>
<td>Russian Federation</td>
<td>1,432,913</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>India</td>
<td>1,220,926</td>
<td>5</td>
<td>65</td>
</tr>
<tr>
<td>6</td>
<td>Japan</td>
<td>1,203,535</td>
<td>5</td>
<td>70</td>
</tr>
<tr>
<td>7</td>
<td>Canada</td>
<td>517,157</td>
<td>2</td>
<td>72</td>
</tr>
<tr>
<td>8</td>
<td>South Korea</td>
<td>446,190</td>
<td>2</td>
<td>74</td>
</tr>
<tr>
<td>9</td>
<td>Mexico</td>
<td>383,671</td>
<td>2</td>
<td>76</td>
</tr>
<tr>
<td>10</td>
<td>Iran</td>
<td>360,223</td>
<td>1</td>
<td>77</td>
</tr>
<tr>
<td>11</td>
<td>Australia</td>
<td>356,342</td>
<td>1</td>
<td>79</td>
</tr>
<tr>
<td>12</td>
<td>South Africa</td>
<td>345,382</td>
<td>1</td>
<td>80</td>
</tr>
<tr>
<td>13</td>
<td>Saudi Arabia</td>
<td>340,555</td>
<td>1</td>
<td>81</td>
</tr>
<tr>
<td>14</td>
<td>Brazil</td>
<td>313,757</td>
<td>1</td>
<td>83</td>
</tr>
<tr>
<td>15</td>
<td>Ukraine</td>
<td>306,807</td>
<td>1</td>
<td>84</td>
</tr>
<tr>
<td>16</td>
<td>Indonesia</td>
<td>306,491</td>
<td>1</td>
<td>85</td>
</tr>
<tr>
<td>17</td>
<td>Thailand</td>
<td>231,927</td>
<td>1</td>
<td>86</td>
</tr>
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<td>18</td>
<td>Turkey</td>
<td>207,996</td>
<td>1</td>
<td>87</td>
</tr>
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<td>19</td>
<td>Malaysia</td>
<td>151,630</td>
<td>1</td>
<td>88</td>
</tr>
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<td>20</td>
<td>Kazakhstan</td>
<td>147,921</td>
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<td>88</td>
</tr>
<tr>
<td>21</td>
<td>Egypt</td>
<td>143,697</td>
<td>1</td>
<td>89</td>
</tr>
<tr>
<td>22</td>
<td>North Korea</td>
<td>143,216</td>
<td>1</td>
<td>89</td>
</tr>
<tr>
<td>23</td>
<td>Argentina</td>
<td>133,322</td>
<td>1</td>
<td>90</td>
</tr>
<tr>
<td>24</td>
<td>Uzbekistan</td>
<td>122,330</td>
<td>1</td>
<td>91</td>
</tr>
<tr>
<td>25</td>
<td>Pakistan</td>
<td>108,677</td>
<td>0</td>
<td>91</td>
</tr>
</tbody>
</table>
instruments for the rest of the economy such as transportation and buildings.

By itself, this style of nominating policy packages is unlikely to be effective because governments might simply nominate what they were planning to implement anyway. Or, they might nominate fanciful ideas that have little chance of real implementation. Whether simply restating the status quo or propagating a fantasy, collective action will not emerge. Thus the process of negotiating packages must include a mechanism for review and scrutiny. There are many precedents that could guide the creation of the needed capacity for the case of climate change. WTO accession talks, for example, involve review of policy packages by the WTO secretariat and also, especially, interested WTO members. That approach, in effect, shifts the requirements for institutional review to the countries that are most interested in and capable of supplying review functions – for WTO accessions that is usually the United States and the European Union. A second approach to creating the needed institutional capacity is to rely on a rotation so that no single country is saddled with the function on a permanent basis. Such a rotation exists in the G8 and in the North Sea and Baltic Sea ministerial conferences – the host country supplies the functions of review. That model has worked quite well for the North Sea ministerial conferences, especially, because all host countries have been motivated and competent. Host country review has been less impressive in the G8 (where it is erratic); it would have failed in the Baltic Sea ministerial conferences if not for an active program to build up the capacity of the east European countries when they hosted the meetings. A third model, however, is probably most appropriate for the climate area: a semi-permanent qualified review staff. That model is followed in the IMF. In the EU, as the agenda has become more complicated the functions of policy review have, de facto, shifted from the rotating EU presidency to the permanent bureaucracy. The standard reasons for a permanent secretariat usually involve the benefits of a reliable and competent staff and the gains that arise from continuity. Those reasons are valid, but there is another that may be even more important: confidence. Countries do not easily submit themselves to allow review of their policies, and the system will fail if those reviews are conducted in a way that does not balance the collective need for serious review with the individual sensitivities of sovereignty. The experiences of the WTO and the North Sea conferences, among many others, show that it is possible to balance those conflicting
needs in a way that (with time and confidence) creates a truly effective review mechanism.

The review mechanism would perform at least three major functions. First, it would service the negotiations – making it possible to compare the level of effort implied in disparate policy packages that governments propose. Such comparisons would require analytical support such as energy modeling – much as is done by reviewing countries during WTO accession talks. Second, the review mechanism could play a role in checking to see whether countries are actually implementing what they have promised (and, if not, the reasons for the shortfall and the adequacy of new measures that countries might implement to compensate for areas where they fall short). In international institutions there are weak versions of this review function – among the very weakest are the country reviews being conducted under the UNFCCC at present, but similarly weak reviews include the OECD science policy and environmental policy reviews. This review function might begin in this weak mode because it will be difficult for countries to gain confidence until they see the institution at work. The experience with the OECD science policy and environmental policy reviews suggests that even in the weak mode the external scrutiny can exert a significant influence. A stronger version of this function is seen in the North Sea and Baltic Sea conferences where, in advance of every ministerial meeting, a detailed review of each country’s efforts helped to set the scene for discussions about the actions that would be needed next. The IMF reviews offer an example of this function being performed in an even more stringent fashion.

The third function of the review process involves checking the collective consequences of the individual efforts. If all the core countries implement their policy packages, what might be the impact on total emissions and eventually concentrations? The WTO offers a partial model for this function, as the WTO engages in country policy reviews with an eye to the overall effects on the world’s trading system. The North Sea and Baltic Sea conferences offer perhaps the best model as such country reviews have been conducted in light of common goals – for example, cutting nitrogen pollution in the North Sea by 50 percent, or eliminating pollution “hot spots” in the Baltic Sea. In some earlier work, colleagues at the International Institute for Applied Systems Analysis (IIASA) and I compiled highly detailed studies of such review experiences; what is most striking is that there are many such examples – especially when looking
beyond the simple canon of international environmental law to the slightly more obscure (yet probably more relevant) precedents such as the North Sea and Baltic Sea cooperative efforts (see generally Victor, Raustiala, and Skolnikoff 1998). Such collective reviews will require some goals to use as benchmarks – such as long-term concentrations, rates of change, or emissions. Such goals will be much easier to adopt in a nonbinding framework where countries are less sensitive about formal compliance than in a binding treaty. Indeed, in the North Sea and Baltic Sea cases (and many others), efforts to set meaningful goals through binding treaties failed; once nonbinding instruments were available it was much easier to agree on goals.

My proposal for an architecture is based on this “club” of countries that would negotiate policies through the process of proposal, review, and scrutiny just outlined. In addition, my proposal has two other elements. One element is the need for binding and more-universal agreements as a complement to the club approach. Binding agreements would be used for particular topics where countries have confidence in their ability to implement actions and where binding law has a special value in “locking in” a set of commitments. More universal agreements would be used to extend the basic approaches that emerge from the core club. They would also serve the function, already performed well by the UNFCCC, of providing standards and information that have universal application – for example, procedures and data for emission inventories.

Another major element of my proposal is a new way to engage with developing countries. At root, the problem with developing countries is that their interests vary with those in the industrialized world and yet their participation is essential to the long-term success of any effort to control greenhouse gases. The club approach will make it easier to engage them because smaller groups with a more intense focus on serious policy packages will facilitate the tailoring that could get key developing countries involved. However, clever tailoring is not enough; a mechanism is also needed to address the problem of diverging interests. I have suggested that the approach of compensation is not working; the CDM, fundamentally, is unable to direct compensation to the kinds of activities in developing countries that would have large leverage on emissions in the future.

An alternative approach would focus not on compensating these countries for implementing policies that they don’t favor but, instead, finding policies that align with their interests (e.g., Heller and Shukla,
Examples include clean natural gas infrastructures in China, which would help the Chinese address local air pollution problems while also cutting by half the emissions of \( \text{CO}_2 \) when compared with coal. Other examples include provision of proliferation-resistant nuclear power technologies and fuels to India, which would help shift the Indian economy away from coal and diversify the sources of electricity. Elsewhere, colleagues and I have calculated the huge leverage on carbon emissions that would arise from such an approach (e.g., Victor 2006; Jackson et al. 2006).

Such an approach is not the classic “free lunch” or “low-hanging fruit” approach to climate policy, for both these policy examples would require effort. Expanding the use of gas in China will require an accommodation with fuel suppliers – notably Russia. Allowing India to obtain commercial nuclear power technologies will require legislative action to lift export controls in the United States as well as broader international agreement on new fuel cycles. What matters, though, is that the style of these negotiations and the interests involved are radically different from the standard discussions about climate change. The developing countries have a much stronger (and positive) fundamental interest in adopting such policies, and thus the problem is not compensation to get them to do something they otherwise abhor. The key participants in making these arrangements are very different from those who have dominated climate change negotiations so far, as these participants include the investors in new power plants and energy infrastructures, fuel ministries, and the industrial-planning arms of these governments. Climate change negotiations, by contrast, are dominated by foreign ministries and environmental ministries. Each of the deals that would be needed to make these climate-friendly infrastructure investments feasible will have its own characteristics and could be extremely complex to negotiate, and thus this approach would contrast sharply with the CDM. Rather than hundreds of small and marginal projects, this style of engaging developing countries would focus on just a handful of large pivotal actions involving just a few critical countries.

Conclusions

The Kyoto Protocol has faced tough times not just because the problem of global warming is exceptionally difficult to address but also because the architecture chosen was inappropriate for the task at hand.
treaties negotiated through processes dominated by diplomats do not offer good prospects for serious cooperation. Such instruments work best when governments can be confident of their ability to comply with their commitments and when it is relatively easy to negotiate those commitments. Yet the climate problem is marked by high uncertainty about the ability to implement promises, especially when promises are codified as emission outputs rather than policy efforts. Universal participation, another maxim of the Kyoto Protocol, is important when leakage is a serious concern. Yet, in practice, these early decades in the global effort to address climate change are marked by the diversity that arises from experimentation and generally low carbon prices — conditions where leakage is not a paramount problem.

I have suggested an alternative approach that is rooted in a small club and is based on a much more intensive negotiating and review process. This club review scheme, such as the “L20” concept proposed by former Canadian Prime Minister Paul Martin, allows for much finer tailoring of policy commitments around the efforts of a few key countries. While the idea is relatively new in the debate about collective action to address climate change, such club approaches have been used effectively in many other areas of international economic policy, such as in the WTO and the IMF, and a few areas of environmental policy, such as in the successful collective efforts to clean up the North Sea and the Baltic Sea.

References


