

**CENTER ON
INTERNATIONAL
COOPERATION**

An Institutional Architecture for Climate Change

A concept paper

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March 2009

Commissioned by the Department for International Development

INTRODUCTION AND SUMMARY

Climate change presents us with a massive, unprecedented and multi-faceted challenge. It can be seen as a profound market failure resulting from misaligned incentives; as a behaviour problem, requiring marked shifts in the choices of millions of organisations and billions of people; as the stimulus for an epochal shift in historical periods, away from the energy systems that were at the core of the process of modernisation; as a long-term challenge that must deliver results over spans measured in generations; or as an immediate-term challenge that must be addressed by most, or all, of the world's nations within just a few years.¹

Climate change is all of these things, of course, but above all, the challenge is one of leadership, co-ordination and collective action – and hence about *institutions*. Global, national and local systems – and the incentives that govern them – must be re-engineered to deliver a stable climate at the same time as supporting a population that is growing in size, wealth and aspirations.

The institutional challenge

To meet this challenge, the institutional framework for managing climate change must walk a delicate balancing act. It needs to balance short and long-term interests at the same time as embodying some broadly acceptable notion of fairness. It must be seen as credible and specific enough to lead to far-reaching changes in how people interact with other socially and economically, yet also flexible enough to adapt to unexpected demands in the future. And it must match pragmatism and political realism today with the need for effectiveness that will last well beyond tomorrow.

This is an enormous task, then, made more complex by the fact that effective institutions are rarely just designed; on the contrary, they *evolve* organically, especially in response to shocks and changes in their external environment.²

Paradoxically, though, the institutional dimensions of global climate change are some of the least studied and worst understood facets of the challenge.

On the science front, the IPCC has marshalled a small army of technical expertise to forge consensus on the scale of the problem we face.³ On the economics front, the Stern Review has launched a global debate on the relative costs of action and inaction.⁴

Climate stabilization will not be possible without a similar effort to understand the institutional innovations that can deliver deep and co-ordinated emissions cuts over the rest of this century, while also ensuring an effective response to the impacts. These innovations must also be considered in conjunction with the other key social, economic and environmental problems the world will face in the coming decades, in areas such as security, trade, finance, resource scarcity and so on.⁵

For now, the world's governments remain largely caught in sectoral 'silos'; interest groups, the media, and academia suffer from much the same affliction. But the day when much more serious thinking about the institutional innovation needed to stabilize the climate cannot be put off much longer.

Institutions and what we want them to deliver

Institutions are not the same things as organisations, of course. Instead, as Douglass North puts it:

Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic. Institutional change shapes the way societies evolve through time and hence is the key to understanding historical change.⁶

Institutions thus provide the *framework* within which individuals and groups operate – and consequently they have deep cultural roots. They embody a society's understanding of how the world works – an understanding that may be more or less accurate, and hence more or less sustainable. Furthermore, they set the conditions for varying levels of co-operation, competition and conflict – thus making more or less effective use of the natural and human resources that are available.⁷

As North argues, an institutional perspective allows us to understand the different paths along which human societies have evolved; how they have reached their current state. But climate change forces us to go further – to project that understanding *forward*, in an attempt to cajole *all* societies towards a low carbon future, from whatever point they find themselves today.

This task requires a collective effort to develop a *model of the future* that incorporates our increased understanding of the science and economics of climate change.⁸ It implies the need then to distil this model into a coherent, stable *web of constraints* (both formal and informal). And finally, these constraints must be *enforced* to deliver results.

On the other side of these steps lies the prospect of a *shared operating system* for the governance, management and control of greenhouse gases that embodies the beliefs, thinking and structures that together amount to an institutional solution for the problem.⁹ This, then, is the ultimate objective of all climate policy, and the destination which we will, by definition, arrive at if we are managing the challenge successfully.

Executive summary

Section 1 of the paper presents three scenarios that show possible end states for the institutional architecture for climate in 2030 – by which time the new system

would need to be functioning well, if commonly-discussed climate stabilization pathways are to be achieved.

- In *Age of Climatology*, early success in negotiations nonetheless fails to lead to a sustainable deal.
- In *Multilateral Zombie*, an early breakdown in international co-operation is followed by the eventual emergence of a new order based on a patchwork of bottom up solutions.
- Finally, in *Operating System*, a long-term deal proves sufficiently robust to deliver results, based on an ambitious effort to integrate all aspects of international reform, and an approach based on agreeing shared principles and a long-term route map rather than just incremental initiatives.

Section 2 explores the drivers that underpin the scenarios, focusing on climate impacts and carbon productivity. We argue that any attempt to design a new institutional system will fail if it starts from a structural perspective. Rather than beginning with prescriptions for new organisations, treaties, summits and so on, we discuss the *goals and functions* of a new institutional architecture, and then how these functions could be delivered in a way that fulfils the overarching goal. *Form*, in other words, follows *function*.

Section 3 discusses the multilateralism we have now, and tests it against three key criteria for institutional success: the coherence of the goals it sets, how credibly it discharges its functions, and its resilience over the long time periods needed to stabilize the climate. We argue that the current institutional architecture fails each of these tests and significant reform is needed.

Section 4 of the paper discusses the multilateralism that we need. It argues that in order to satisfy the criteria set out above, policymakers must focus in particular on three functions: constraining emissions in order to achieve a stabilization target; ensuring equity and burden-sharing; and enforcing high levels of participation and compliance. It explores the need for institutional innovation, with new structures created that have considerable independence from national governments, while exploring how the existing institutional mandate can be reviewed.

Section 5 of the paper, finally, explores how a new multilateral system can be created. Achieving this task will involve an investment in *shared awareness* – among both policymakers and wider publics – about the nature of the problem and what solutions to it will look like. Policy actors will then need to take a politically sophisticated approach to influencing and alliance building, centred on what we term *shared platforms*.

ONE | SCENARIOS

According to Peter Schwartz, “scenarios are a tool for helping us to take a long view in a world of great uncertainty”.¹⁰ By telling stories about the future, decision-makers are able to gain a greater understanding of what drives change, and to articulate ‘pathways’ from the present to various end states.

Scenarios are particularly useful for climate because:

- There is great uncertainty about the future, due to the complex interplay between natural and socio-economic systems. Scenarios help policymakers explore these interactions.
- The future is likely to be very different from the present, due to the impact of climate change and attempts to decarbonise the global economy. Scenarios force us to confront the scale of the changes that are to come.
- Given investment cycles, decisions taken today have considerable impact on the future.¹¹ Scenarios encourage us to explore the consequences current policy will have over the long-term.

This section draws on insights from a number of other scenario development exercises.¹² However, we focus narrowly on climate institutions and exclude most non-climate variables. We set out three scenarios – each of which is supposed to be illustrative, rather than predictive. Their implications are then discussed in section 2.

Scenario 1: The Age of the Climatocracy

After talks continued without a break for almost 24 hours at the climax of the Copenhagen summit, negotiators emerged from their exhausting marathon of plenary and breakout sessions to tell the waiting world: the talks had ended in triumph. *Kyoto 2 had been agreed.*

Developed countries would take on binding targets from 2012 to 2020. Major financial commitments on adaptation, technology transfer and avoided deforestation had been made, while a pilot sectoral approach for the global cement industry was in prospect. Best of all, the agreement stated that emerging economies would consider binding targets in the next Commitment Period.

True, it was regrettable that Canada and Russia had declined to sign, while NGOs were critical that the targets amounted to an aggregate developed country reduction of only 16% below 1990 levels, rather than the 25-40% they had hoped for. But most observers agreed that *Kyoto 2* was a bold step in the right direction.

The problems started not long afterwards. Which of the BRICs and middle income countries would take on targets, and when? This question turned toxic in the bruising

ratification battle that was fought in most of the rich countries. As the global economic slump led to steadily increasing protectionism, almost every country became convinced it hadn't got a fair deal.

Even so, there was jubilation in 2014 when the Copenhagen treaty finally came into force (albeit with Australia opting out once more, and a two-year break having decimated fragile carbon markets). Governments proclaimed that emissions – already constrained by economic slowdown – would finally begin to come down.

Sure enough, with the treaty in force, funds for adaptation and technology transfer began to flow, with a hodgepodge of competing multilateral agencies, bilateral donors and developed country environment ministries fighting to control them. The attempt to stitch together a global carbon market also hit obstacles, but at least the European market was up and running, with a US market not far away. Then it would simply be a matter of integrating them with each other, and with the reformed Clean Development Mechanism, in order for a global carbon price to be (more or less) established.

In retrospect, the Paris Declaration of February 2015 reads like something of a tame document. But at the time, however, it was both a bombshell and a tipping point. Five hundred scientists came together to denounce in coruscating terms both the 'creeping politicisation' of the IPCC and the failure to finalise a fifth assessment report. The world was losing its grip on the problem, they claimed. Implementation of the leaky 'solution' was now a joke.

Suddenly, it was open season on what one commentator dubbed the 'global climatocracy'. Soon the world's media was leading on climate corruption. One President of a low income country, it turned out, had used carbon funds to buy a fleet of private planes. And the US carbon market had been rigged by investors – four of whom were sentenced to 65 – yes, 65 – years in jail.

Something had to be done. And something was, after a while at least. In 2017, a world summit was convened in New York to try to retrofit a strategy onto climate's increasingly creaky institutional structure. The dynamics at the summit were acrimonious. Rich countries wanted more regulation of climate funds. Poor countries wanted more action by those developed countries who were off-track on their targets.

The one outcome that all countries did prove able to agree on, though, was a time-honoured one: to set up a new UN agency, in this case a World Environmental Organisation, bringing together the UN Environment Programme, the Commission for Sustainable Development, and a number of multilateral environmental agreement treaty secretariats.

Environment ministers provided less clarity on what the new WEO would actually *do*, however – and in any case, the agencies involved in the merger spent most of the

next two years working out the logistics of transferring their operations to a new home in Nairobi.

There wasn't much appetite for Kyoto 3, but a review summit *was* held in Luanda in 2020. Scientists pointed out that emissions were still far from peaking and that radical action would be needed to stabilize concentrations even at 650ppm. The problem was that richer countries had *already* emitted the lion's share of the amount of carbon available to meet that target. The implication: *there weren't that many emissions left for a deal to carve up.*

But that didn't stop progress towards another agreement – this time focused on support for clean technologies, rather than binding targets or carbon prices. That at least cleared up some of the co-ordination problems that had bedevilled financing flows under Copenhagen. But as critics noted, policymakers seemed to have fallen into the trap of throwing money at the problem rather than trying to start a 'race out of carbon'.

By now, of course, oil price volatility was recognised as the central bugbear of the global economy. Every time economic activity started to pick up, the oil price rose too, bringing growth to a halt. After all, not much long-term investment had been made in oil *or* in any other energy source. Business had spent twenty years waiting for low carbon technologies to come on stream; now it was clear that these two decades had been squandered.

In 2025, the unthinkable happened: methane hydrates, hitherto frozen safely at the bottom of the ocean, began to thaw and escape into the atmosphere, adding massive quantities of a potent greenhouse gas into the air. Emergency sessions of the Security Council and the G13 were convened, but the scope for action was minimal.

By 2030, the Climatocracy had clearly failed to deliver. Geo-engineering projects looked like the last remaining option. Whether or not they would work remained to be seen...

Scenario 2: Multilateral Zombie

After talks continued without a break for almost 24 hours at the climax of the Copenhagen summit, negotiators emerged from their exhausting marathon of plenary and breakout sessions to tell the waiting world: the talks had ended in stalemate. *Everyone would need to come back in six months to have another go.*

Despite the rhetoric from all sides, the EU and the US had failed to engage each other. The G77 bloc, meanwhile, was split between two competing fears, with one group of countries focused on growth constraints and another more worried about climate impacts.

Initially, there were high hopes for the ‘COP15 bis’ in Bonn – but these were dented when it broke up with only an agreement to keep talking. More working groups were set up and climate negotiators saw even less of their spouses or children. But while they kept the faith, it became increasingly clear to those outside the bubble that the multilateral climate process was now a zombie – staggering on, but never quite dying – just like the Doha trade round before it.

Each country took a different message away from the slow motion failure. The EU continued to believe that a deal would be possible with ‘one last push’ and decided to extend its carbon market to 2020 (though with some dilution to its much-trailed 20% target, achieved through an amendment to the baseline date).

The US, meanwhile, sprayed money at low carbon technologies, mostly as a fiscal stimulus, but also to increase energy security and assuage a green lobby enraged by President Obama’s failure to do a deal.

China, too, pursued a twin track strategy. On the one hand, burn coal quickly (in case doing so became more expensive in the future). On the other, try to lead low carbon industries (in case that’s where the Googles of the future were to be found). The latter strategy was mildly infectious, with countries and companies laying modest bets to gain first-mover advantage.

The politics of climate change, meanwhile, became ever more contentious. Advocacy groups of all stripes were having a field day, with ‘direct action’ steadily creeping onto the agenda. Eco-terrorism started as a joke, until it wasn’t funny anymore: February 2014 saw the co-ordinated kidnap of three oil CEOs, an event that seized headlines until the last corpse was cremated on YouTube nine months later.

But it was 2017 that shook things up, when a group of small island states referred the US and China to the International Criminal Court for climate-driven genocide, while Brussels finally set carbon tariffs on imports from all countries not meeting climate standards. The WTO never really recovered from the sheer volume of disputes generated by the resulting tit-for-tat trade war.

The inexorable rise of commodity prices seemed to worsen the loss of faith in multilateralism. As output from existing oil fields fell rapidly – just as the IEA had predicted in 2008 – so higher oil prices became a major factor for countries, companies and consumers alike, and an increasingly obvious brake on the world economy’s stuttering recovery.

Resource nationalism gripped the world. China and the US, in particular, sought to outbid each other in attempts to lock up oil supplies in Africa, the Middle East and elsewhere. As oil prices rose, so too did those for food, with the price for inputs on the up and biofuels an ever-more aggressive competitor for available land.

The impact on climate was mixed. To be sure, the increasing attention to energy and resource independence resulted in a major boost for renewables, nuclear and energy conservation. But other measures, such as the US rush for liquids-from-coal mandated by President Palin in 2019, kicked emissions higher than ever before.

Developing countries suffered badly. Those with oil never really kicked the resource curse, though Nigeria was the donors' darling until 2022, when it fell prey to the regional war that had started hundreds of miles to the west. Far more countries were afflicted by climate impacts, meanwhile. Bangladesh suffered particularly badly, with high food prices compounding its misery. Its migrants were a major factor in India's progressive destabilization.

By 2024, however, the picture had begun to brighten, as low carbon technologies began to establish a decisive advantage over high carbon ones. Even voluntary markets had had some impact – especially on the Amazon, where investment in bio-resources, eco-tourism, and ecosystem services was starting to generate dividends.

From these efforts, a new approach to multilateral co-operation began to emerge – albeit slowly. In 2028, under President Clinton (Chelsea, avenging her mother's razor-thin 2016 defeat), the US patched up a low carbon zone with the EU. Other countries gradually started to join.

Trade was freed up, and fragmented carbon markets harmonised, with an inspections agency given considerable power to keep countries to their commitments.

Of course, the world would never be quite the same – too much damage had already been done – but the prospect of rapid and radical decarbonization was again on the cards. Optimists even begun to talk about a *'third age of globalization'* (though Thomas Friedman's 47th book – *Now the World is Again Flat* – barely flirted with the best seller list).

Perhaps, then, there was calm water ahead...

Scenario 3: Operating System

After talks continued without a break for almost 24 hours at the climax of the Copenhagen summit, negotiators emerged from their exhausting marathon of plenary and breakout sessions to tell the waiting world: the talks had ended in disaster. *There would be no Copenhagen deal.*

It was much worse than a stalemate; open acrimony had broken out in the main session. (During an all-night night session, a delegate from an emerging economy was forcibly removed from the hall by security after throwing a bound copy of the CDM technical guidelines – nearly half a kilo in weight – at the American delegation.)

Despite the drama, there was a sense that the UNFCCC was not where the action was. Reform of international financial and economic institutions still dominated the agenda. G20 leaders, having managed to forge a co-ordinated fiscal stimulus, had agreed to set up a High Level Commission on Global Economic Reform, to report in the summer of 2010 – with careful regional balance to ensure wide buy-in.

The Commission's milestone report surprised many observers. While the financial crisis would take years to unfold, it argued, leaders needed to remain focused on energy prices, despite their collapse during the downturn. Without a transformation in the underlying supply or demand fundamentals, oil prices were set to return to their pre-crunch bullishness as soon as economies started to recover.

To bring sufficient investment in new oil production on stream, more predictability and stability on the future demand outlook was needed – and, paradoxically, the best way of doing that was for the world to agree to real action on climate change. The Commission thus called for a truly comprehensive deal on climate, one that would give multi-decade certainty on emissions to *all* countries, at the same time bringing the economic, energy, and climate crises into a comprehensive framework.

The first casualty of this realisation was the idea that environment ministers would forge a global deal on climate change at UNFCCC talks. At the end of 2010, it was agreed that a year later in 2011, a World Economic Summit would be held in Tokyo under UN auspices. The role of leaders was crucial in the run-up to the summit (with the G20 doing most of the heavy lifting), while a massive roll-out of public outreach and events led to unprecedented public engagement.

All of this might have been for nothing had it not been for the Summer of Instability. A heat wave and catastrophic power failure caused a few thousand deaths in the American Deep South, while failed monsoons in South and South East Asia led to massive spikes in rice prices and a humanitarian disaster. To cap it all, Europe saw its biggest drought for a generation.

At the summit, opponents of a comprehensive deal were overrun, with countries agreeing to set a binding stabilization target, and to allocate multi-decade targets to each country. While the actual numbers were left for a summit to be held a year later, the Summit Declaration was explicit in recognising that allocation would provide for fair shares over a predictable, long-term time horizon.

Over the next year, work focused on three work streams:

- A scientific committee drawn from the IPCC began to develop options on a stabilization target and the likely budget of available annual emissions over time.
- Countries, meanwhile, began to discuss a mechanism by which this budget could be shared out over the long term.

- An international commission, finally, was charged with developing concrete recommendations on the institutional architecture needed to deliver any deal.

In the end, the 2012 New Orleans Summit became termed the ‘battle of the algorithms’. It was clear to all that some formula for sharing out the emissions budget would be needed if the talks were to have any hope of success. India wanted per capita emission allocations, while the US wanted GDP to be factored in (arguing that wealth creation is a service to the global economy). China – whose emissions were already significantly above the global per capita average – argued for a third distributional principle, based largely on historical responsibilities.

Although the disagreements between the three camps were stark, the will to forge a deal prevailed. The result was ‘the Algorithm’, a sophisticated mathematical formula that linked emissions allowances and finance, while bringing total emissions down over time towards a quantified stabilization goal. A revamped IMF was charged with administering the new limits and a global carbon market, with the IPCC feeding in any amendments to the overall concentration target.

While the Algorithm was simple in theory, the reality of country allocations was more messy. Many countries organised themselves into regional blocs to refine the detail of their allocations, with the US adding to its starting allowance by offering preferential access to markets and intellectual property to countries willing to cede part of their carbon entitlement to it.

In December 2013, a year after the New Orleans summit, the new system went live. By and large the emissions trading system worked well, although there were (occasionally severe) teething problems on monitoring, reporting and verification. Worst of all were a couple of scandals involving countries with weak governance (one of which, embarrassingly, was a prominent member of the EU).

The system’s biggest test came in 2025. After years of gradual acidification, the capacity of the world’s oceans to absorb CO₂ moved from gradual degradation to total breakdown. With such an important ‘buffer’ suddenly removed, the world’s carbon budgets needed to be tightened immediately in order to stay on track for climate stabilization. For an awful moment, it looked as though the entire system would collapse under the political pressure.

A chorus of emerging economies demanded more room to develop their economies, while developed country industry lobbies started to sharpen their knives for the kill. But the institutional framework that had been built up over the preceding decade proved up to the challenge.

The merger of the IPCC with the IMF in 2022 meant that there was an unrivalled body of expertise spanning scientific assessment and economic asset allocation, with clear primacy in target setting. On the basis of the IMF’s advice, governments acted swiftly to mount a ‘bailout’ of the world’s carbon budget.

Normal rules were suspended briefly, but then reapplied, with large flows of transitional assistance to those countries that found themselves under the greatest pressure as the world's carbon budget was tightened.

The bottom line, observers agreed in retrospect, was that most countries simply had too much invested in the new system – politically and economically, as well as financially – to allow it to fail. In effect, carbon permits had become the blood of the world's financial system: the world's new reserve currency.

Conclusion

The climate scenarios illustrate three very different end states in 2030.

The *Age of Climaticracy* shows how success in negotiations can nonetheless fail to lead to a sustainable deal, with growing climate impacts leading to steadily declining levels of international effectiveness. It illustrates the dangers of achieving cosmetic agreement that is not backed by a process of institutional change. By 2030, in this scenario, only a 'magic bullet' or serious economic decay (perhaps aided by conflict) can bring emissions under control. The scenario shows the dangers of merely *replicating* the Kyoto Protocol – which is not to say that *building* on Kyoto is the wrong approach.

In *Multilateral Zombie*, an early breakdown in international co-operation is followed by the eventual emergence of a new order based on a patchwork of bottom up solutions. Concentrations are stabilized in this scenario, but at a high level. In 2030, the key question is whether dramatic emissions cuts can be achieved by 2050, given increasingly sophisticated low carbon technologies and a growing commitment to international co-operation. How bad will the overshoot be? Will future emissions be low enough that greenhouse gas concentrations can decline from their peak?

Finally, in *Operating System*, a long-term deal proves sufficiently robust to deliver results, while being flexible enough to respond to unpredicted shocks. It results from an ambitious effort to integrate all aspects of international reform, and an approach based on agreeing shared principles and a long-term route map rather than just incremental initiatives. The going is tough to begin with, but ambition is rewarded over time as a result is achieved that brings together top down co-operation and bottom up innovation.

TWO ! SIGNALS FROM THE FUTURE

So what lessons can be drawn from the scenarios about what makes international institutions succeed or fail in the context of climate change? What are the central factors that will be the foundations of success if the international system gets them right, or the causes of failure if it does not?

This section explores the drivers that underpin the three scenarios, focusing on the influence that *climate impacts* and *carbon productivity* have on countries' commitment to pursuing shared solutions at a global level.

It then sets out a key theme that stands out from the scenarios: the importance of 'signals from the future,' the idea that any institutional framework embodies a set of values, assumptions and expectations of the future – regardless of whether they do so intentionally or accidentally, implicitly or explicitly.

At the heart of the challenge, therefore, is the need to build institutions that provide *coherent* and *credible* signals about future challenges, risks and opportunities, and to ensure that the institutional framework is sufficiently *resilient* to maintain its function over the long-term.

Driver of Change: climate impact

Climate science has been the single most important factor driving climate policy. This will continue to 2030, as policy makers continue to make decisions today based on what experts tell them will happen in the future.

The IPCC is perhaps the most notable institutional innovation spawned by climate change (emissions trading, another important innovation, has its roots in air pollution policy rather than climate change). The Panel's primary role has been to provide a *credible assessment* of the long-term risk of climate change. At the same time, it has acted as an *anchor* for global understanding of the nature and extent of the climate problem. Its independence and authority hence need to be protected – and if possible, enhanced.

In our scenarios, however, we see a switch in focus *from prospective to actual impacts*. These impacts may be more or less:

- *Intense*, depending on how fast temperatures rise, and how sensitive natural and socio-economic systems prove to be in the face of a changing climate.
- *Predictable*, depending on how accurate models of future impact turn out to be, and on the number of climate catastrophes and sudden, non-linear climate shifts.
- *Detectable*, with some changes directly observed by the public and media, and others only accessible via scientific observation.

- *Contested*, with varying degrees of consensus as to whether an impact can be ascribed to climate change or other causes.
- *Media friendly*, with impacts that have a strong narrative, evoke powerful emotions, and/or are highly visual, amplified by media coverage.

In sum, impacts that are intense but unpredictable, easily observed by the public and clearly a result of climate change, and magnified by the media, are the ones most likely to demand a policy response.

This is not a rational relationship. Drama and visibility will count for more than some objective indicator of consequence (see figure 1). A single event, or ‘perfect storm’ of unrelated events, could rapidly reframe the policy environment and lead to a burst of institutional innovation and reform (‘Operating System’). Equally, a climate shock could stress the international system (‘Climatocracy’), testing the *resilience* of any institutions we build.

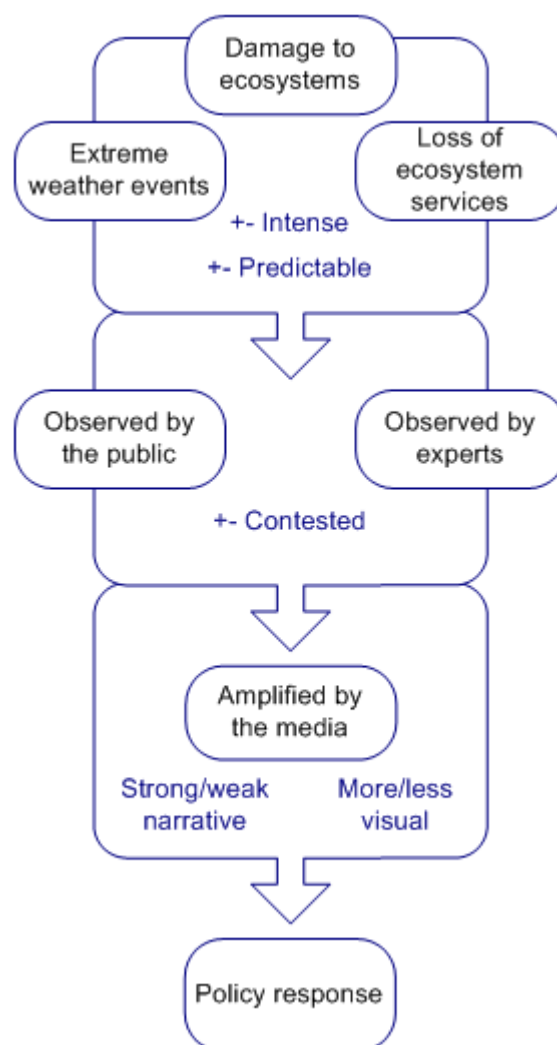


Figure 1

Driver of Change: carbon productivity

The second factor driving institutional development will be the effectiveness with which the world responds to growing scarcity. Between now and 2030:

- The UN projects that global population will increase by 1.8bn people (with a range of 1.2-2.4bn) – a 20% increase.
- An annual growth rate of 2.8% would see global GDP *doubling*, leading to a 57% increase in per capita incomes from \$5,488 to \$8,606 (regarded by OECD as a conservative prediction).
- Inequality will inevitably rise, given that almost all of the population growth will be in developing countries, with the least developed countries seeing the fastest increase.
- The supply of key resources will be limited – with unmet demand for land, water, energy, food, and the right to emit greenhouse gases.

As the scenarios show, any attempt to tackle climate change that neglects growing pressure on resources, at a time of rising aspirations, is doomed to failure. Delivering growth in conditions of scarcity will be the major economic challenge in the period before the world's population stabilizes. Institutions will only be resilient if they deliver a *coherent* response to these challenges.

But socioeconomic forces also provide the 'raw material' that institutions must work with (and shape). Take the simple metric of carbon productivity, defined as the greenhouse gases needed to produce a unit of GDP. According to McKinsey analysis, carbon productivity would need to quadruple by 2030 for a 2 degree carbon stabilization.

McKinsey describes this productivity growth as primarily a microeconomic phenomenon, where: "new technologies are developed and deployed, new investments made, new infrastructure put in place, and changes occur in the decisions, practices, and behaviours of millions of business managers, workers, and consumers".

Carbon productivity is thus where the bottom up (the behaviour of billions of people) meets the top down (policy interventions that aim to shape, incentivize or otherwise control this behaviour).

Signals from the future

Together the two drivers for change show the potential for:

- *Vicious circles* – where policy failures are piled on market failures, carbon productivity increases much more slowly than expected, and crisis leads to

systemic stress, institutional failure and a gradual decomposition of the system ('Climatocracy').

- *Virtuous spirals* – where crisis leads to greater investment in international institutions, and where behavioural change and institutional innovation reinforce each other, producing rapid changes in carbon productivity ('Operating System' and, after a considerable lag, 'Multilateral Zombie').¹³

This demonstrates a crucial point: *action taken on climate change today is fundamentally influenced by expectations of what will happen in the future*. By extension, the primary task for climate institutions is to *shape* expectations about future policy responses over the very long time periods associated with climate change.

Their role, in other words, is to send back *signals from the future* to influence decisions made today (see figure 2).

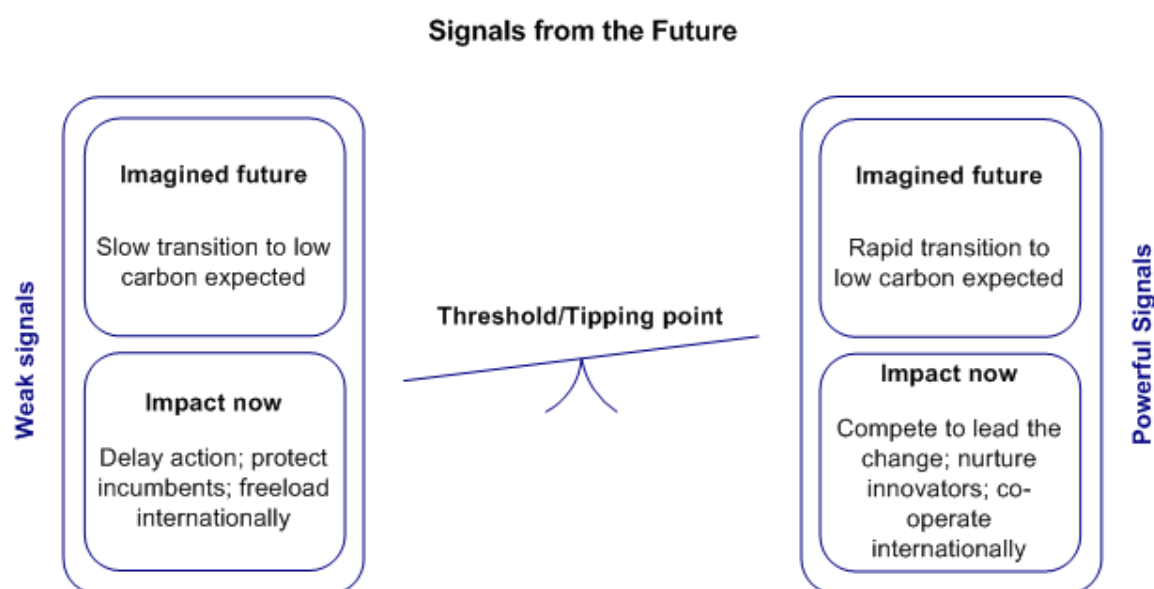


Figure 2

If countries (or companies, or citizens) expect a slow transition to a low carbon world, then it makes sense for them to 'free-ride' internationally and to protect incumbents and vested interests. Moreover, given the long investment horizons involved, all actors share an interest in predictability: so if, on balance, they expect a slow transition, then it is also rational for them to *reinforce* that dynamic by seeking to slow the process down themselves.

If, on the other hand, perceptions tip to the other side – towards expecting a *rapid* transition to a low carbon world – then a virtuous circle is much more likely to develop, as actors will have incentives to lead the change, nurture innovators, and co-operate internationally.

In thinking about an institutional architecture for climate, therefore, we need to consider three things in order: its *goal* – what the system is ultimately ‘designed’ to achieve; its *functions* – what it is expected to deliver in pursuit of that goal; and finally its *form* – what norms, incentives, structures, networks, organisations can operationalize these functions.

Future expectations

At present, the goal embodied in our current institutional structure for climate is weak, confused and contradictory. Today’s institutions are structured in such a way that assumes that:

- *The likely impact of climate change will be considerably less than predicted by the IPCC.* Emissions are climbing at a rate that makes more rigorous stabilization levels difficult, or impossible, to achieve.¹⁴
- *The cost of reducing emissions far exceeds the benefits, while there is little need to insure against catastrophic impacts.* Countries, firms and individuals behave as if they believe that they cannot afford the transition to low carbon development.¹⁵
- *Short-term economic imperatives outweigh longer-term interests, including both economic and – especially – non-economic ones.* While there is growing appreciation of the damage we are doing to future generations, there is not sufficient commitment to overcome the obstacles to collective action.
- *The needs of the poor should be given less weight than those of the rich.* The poor, both across and within countries, will suffer far more from climate change.

In sum, whatever our rhetoric, today’s institutions are in effect making a ‘bet’ that the climate will change much less than scientists tell us to expect (see figure 3). The challenge for the future is to increase:

- The *coherence* of the institutional structure, to ensure that it expresses long-term goals that are in line with scientific knowledge.
- Its *credibility*, ensuring it has sufficient functional capacity to create near-term incentives for action to secure the long-term goal.
- And its *resilience*, ensuring its structure and form is sufficiently robust to maintain coherence and credibility over a sufficient period of time to stabilize the world’s climate.

	Expectations
Expected impacts	What we believe will happen if greenhouse gas concentrations rise to a certain level.
Rationale for action	How we assess the costs and benefits of stabilizing concentrations at a certain level – as well as how we overcome obstacles to collective action.
Risk appetite	How willing we are to take a chance that impacts will be considerably worse than anticipated. How willing we are to take a chance that reducing emissions will be much harder or expensive than anticipated.
Equity	How much inequity we are prepared to tolerate between rich and poor How we balance the needs of the present and the future
Quality of life	The balance we strike between economic development and other components of human well-being or quality of life.

Figure 3

In Section Three, we assess the extent to which our current climate institutions embody these qualities. We then make some tentative suggestions about how the coherence, credibility and resilience of a future institutional architecture can be enhanced.

THREE | THE MULTILATERALISM WE HAVE NOW

The UN Framework Convention on Climate Change (UNFCCC) was agreed in 1992 to set “an overall framework for intergovernmental efforts to tackle the challenge posed by climate change.”¹⁶

The implementation of this framework, however, has proven time-consuming and controversial – and has had limited impact on global emissions.¹⁷ A number of new organisations have been created, but signals from the future are still weak, with countries, investors, firms and individuals lacking a long-term framework within which they can make their decisions.

Is it coherent?

The UNFCCC sets out the objective of “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” It remains accepted as the central international treaty by almost all countries, with only a handful (Iraq, Somalia and Andorra) having failed to ratify it.¹⁸

The principal institutional innovations of the UNFCCC and the wider international climate architecture include:

- The IPCC – a broadly accepted arbiter for assessing the nature and extent of ‘dangerous anthropogenic interference with the climate system’, which was set up by the UN Environment Programme and the World Meteorological Organisation in 1988.
- Various instruments for restraining emissions under the Kyoto Protocol, including binding targets, and a cap and trade emissions trading scheme for some developed countries.
- Rudimentary mechanisms for trading emissions and encouraging abatement in countries that have not accepted binding targets, notably Kyoto’s Clean Development Mechanism.
- More or less standardised methodologies for countries to report their attempts to reduce emissions.

Despite these successes, however, policy does not cohere with the Convention’s overall objective. While some countries have attempted to use IPCC research to define ‘dangerous’ climate change, a stabilization target has not been quantified or even seriously discussed. Kyoto’s targets for developed countries were not derived according to objective criteria, but were made on the basis of countries’ own political and economic assessments of what was achievable. Finally, the lack of quantified targets for developing countries makes it impossible to forecast the shape of the

future global emissions curve – and hence equally impossible to say when, and at what level, stabilization will be achieved.

These problems are compounded by other key elements of the current institutional framework. While a plethora of funds has been created for supporting technology, aggregate public investment in energy research and development has declined substantially.¹⁹ The terms of reference of the various funds, meanwhile, are far from clear. Neither is there any consensus about what technology support is needed and how it should be supplied (through finance, knowledge sharing, etc.).

Adaptation, meanwhile, is a concept that is widely discussed (especially in the context of the UNFCCC negotiations), but has proved much harder to operationalize. At present, most work on adaptation is focused on specific, short-term measures rather than on the much broader challenge of ‘mainstreaming’ adaptation throughout poor countries’ development plans (discussed in the next part of the paper).

Finally, financing – often seen as the fourth main area for debate in and around UNFCCC negotiations – cuts across the other three areas of mitigation, adaptation and technology support. The result has been an alphabet soup of financing windows. In part, this reflects attempts by existing organisations to secure a new climate role for themselves. More fundamental problems, however, include:

- The lack of a long-term stabilization pathway (as discussed above), which makes it impossible for any actor (whether country, firm or individual) to know how much they will need to invest in mitigation *or* adaptation.
- The lack of a clear rationale for when, and to what extent, finance is needed to supplement a carbon price and related market mechanisms.
- A lack of clarity over how financing flows for mitigation, for clean technology transfer and for adaptation overlap with one another, and furthermore how finance flows on these areas relate to other kinds of financing in the international system such as Official Development Assistance or private sector investment flows.
- The resulting impossibility of determining how all parts of a carbon deal fit together into a coherent package that delivers climate stabilization, at least cost and within a desired time frame.

Is it credible?

Kyoto’s approach is characterised by the short-term nature of its commitment periods. Under Kyoto rules, national targets are agreed in short increments (five years in the first commitment period), and compliance is then assessed through averaging actual emissions for each year of the period.

However, these short time periods stand in stark contrast to the lifetimes of capital stock, especially in the energy sector. The International Energy Agency estimates that more than half the emissions from electricity generation are already 'locked in' for 2030, for example, while 60% of all plant in the industrial sector will be less than ten years old in 2010.²⁰ As a result, the IEA is unable to model a 450ppm stabilization pathway without replacement of existing capital stock before the end of its usual lifetime.

Credibility is further reduced by the fact that Kyoto covers a shrinking proportion of global emissions. Participation rates make a considerable difference to the cost of climate control, with the cost of stabilization estimated to increase by 70% if countries accounting for 25% of emissions are excluded from a deal.²¹ Indeed, many stabilization pathways may not even be possible without broad participation. (According to the IEA's projections, business-as-usual emissions in non-OECD countries for 2030 exceed the total available for stabilization at 450ppm CO₂e – so without abatement from these countries, in other words, 450ppm could not be achieved even if OECD emissions were reduced to *zero*.)²²

Limited levels of participation, meanwhile, lead inevitably to carbon leakage, with high emissions industries moving to countries with laxer carbon targets. Dieter Helm finds that on a crude calculation, the UK's *consumption* of greenhouse gases increased 19% between 1990 and 2003, even though *production* declined 12.5% – in line with the UK's Kyoto target.²³ Other research suggests that only around half of China's rapid emissions growth is due to increased domestic consumption; the rest are exported.²⁴ In effect, rich countries have exported 'dirty industries' to emerging economies, who then have to bear the cost of investing in technologies for reducing their emissions.

Finally, there is the weakness of Kyoto's enforcement system:

- Systems for monitoring, reporting and verification are weak in many developing countries, making it hard for these countries to participate fully in future emissions reductions. Developed country systems are stronger, but have yet to be tested by a serious international confrontation on emissions performance.
- Only limited sanctions, meanwhile, can be applied to Kyoto parties who fail to meet their targets. Under current arrangements, they receive a 30% fine in the next commitment period, are required to develop a compliance plan, and may lose rights to emission trading mechanisms. None of these measures are likely to have much impact on a country like Canada that is far from its target. Indeed, they simply create an incentive for it to negotiate a more generous target in the next compliance period.²⁵
- Non-parties – countries that have refused to join in the first place – face no sanctions, and thus have a clear incentive to free ride. Australia's decision to opt

in to Kyoto was clearly influenced by the fact that it expects to meet its Kyoto target without much additional effort.²⁶ The United States, meanwhile, is over 20% above its (unratified) Kyoto target, but has received no sanction, aside from reputational damage.²⁷ Indeed, it may well be able to negotiate generous incentives for joining a post-2012 deal.

- Financing pledges are poorly monitored, with the international system still lacking a standardised mechanism for assessing how donor countries are doing against their past spending promises, much less holding them to account to enforce compliance.

Problems with credibility are corrosive and self-reinforcing. Low participation rates, delay, and non-compliance all make future agreements harder to agree and to implement. This makes future deals more daunting to agree, increases policy uncertainty, and slows investment in low carbon technologies.

Is it resilient?

Then there is the question of the extent to which the current multilateral climate system is resilient. Is it able to innovate in the face of new challenges? And it is sufficiently flexible when faced by unexpected shocks and stresses?

This is a hard question to answer, given the short period of time in which most climate institutions have been in existence. However, the signs are not encouraging.

Admittedly, two signs of institutional innovation stand out. The IPCC has, as discussed, played an unprecedented role in providing a link between the policy-making process and climate science. Emissions markets, meanwhile, are now worth around \$64bn annually, with 3 GtCO₂e traded.²⁸ The EU Emissions Trading Scheme, which accounts for nearly 80% of value traded, has helped developed infrastructure that could underpin more ambitious carbon markets in the future.

Yet for the most part, the surprise with climate change is how *little* institutional innovation we have yet seen. Given the scale of the problem – and the extent to which current institutional responses are manifestly falling short of a comprehensive solution – the rate of institutional innovation needs to accelerate sharply. We return in later sections to the question of how this process might be encouraged and accelerated.

A particular source of vulnerability and ‘brittleness’ stems from the high degree of fragmentation between climate institutions and those on and related policy areas. Consider for example:

- *Energy* – where an underlying scarcity trend is compounded by underinvestment, and complicated by price volatility and geopolitical threats to the security of supply.

- *Land* – where increasing use of biofuels is argued by the World Bank, the IMF and others to have been the single most significant driver of rising food prices over the last few years.
- *Economic instability* – where the response to the global financial crisis has proceeded in parallel with talks to agree a climate deal, and where plans to direct a stimulus for low-carbon technologies have been fragmented at best.

In each of these cases, policy discussions have shown the accuracy of the analysis of recent UN High Level Panels which noted that “the fragmented sectoral approaches of international institutions mirror the fragmented sectoral approaches of Governments.”²⁹

In climate change, this problem is compounded by the fact that agreements are negotiated by environment ministers who generally have low status within their governments, and whose position becomes increasingly exposed as the potential impact grows of any deal on economies. One understandable response is to increase centralisation, both within national governments (as heads of state take increasing responsibility for international issues), and at a global level (where there is a trend towards escalating hard issues to fora such as the G8 and, more recently, the G20).

However, the problem with centralisation is that it comes with very limited capacity. At national level, heads’ offices have small staffs that usually have to focus on the urgent rather than the essential. At international level, the limited ‘bandwidth’ of the network of sherpas that prepares the G8 agenda means that summit outcomes more often tend towards headline-friendly ‘initiatives’ instead of comprehensive plans to manage global risks.

In other words, this type of centralisation is a *symptom* of institutional weakness as well as a response to it. It shows the problems faced by an architecture that is not sufficiently integrated to offer a more distributed response.

Summary

Our analysis shows serious weaknesses in Kyoto’s institutional arrangements. While an important start has been made in tackling the issue, Kyoto offers, at best, proof that international co-operation on climate is possible. It does not provide a model for how co-operation should be structured and deepened in the future, with abundant evidence that the institutions we are relying on today are in poor shape to handle the massive challenges ahead.

It is now time to rethink our approach to designing institutions that are structured to deliver the UNFCCC’s basic mission – stabilizing greenhouse gas concentrations at a level that avoids dangerous climate change – over the long-term. This means embodying a more ambitious goal, and discharging it through institutional forms and structures.

So what might the future institutional framework for climate look like?

FOUR : THE MULTILATERALISM WE NEED

The starting point for any global deal on climate needs to be a 'back to basics' focus on the core mission of the UNFCCC – avoiding dangerous climate change. It is then important to focus first on the *functions* that an institutional framework needs to discharge, and only afterwards on the *form* those institutions should take.

We focus on three core functions:

- First, the framework must *constrain emissions* and manage sinks, in a way consistent with stabilization, and as efficiently as possible.
- Second, it must provide for mechanisms to take account of *equity* in the context of both mitigation and adaptation.
- And third, it must include adequate *enforcement mechanisms* to make the regime effective and credible.

These three functions are deceptively simple. Delivering them, however, would inevitably require a completely different international system: one based on a new conception of international co-operation on economy, trade, finance, security, etc. – and ultimately on a different conception of sovereignty.

We therefore discuss each of these functions in turn, before turning to how the international system can begin to deliver them. Our contention is that the difficulty of the problem should lead us to elevate, rather than suppress, our level of ambition. In other words, it is only by confronting the need for a radically different concept for multilateralism that we can prepare the ground for delivering that concept in the future.

Mechanisms for constraining emissions

The goal of climate stabilization cannot be fulfilled without a quantification of the level at which greenhouse gas concentrations must be stabilized if dangerous climate change is to be averted.

At present, we work from the short (5-year emissions targets) towards the long-term (eventual stabilization at an unspecified level). Moving forward, this logic must be reversed, with the longer driving the shorter term (see figure 4). This requires:

- A *full-term* stabilization target – quantified and binding – must sit at the heart of the system.
- This target can then be used to derive a safe global *emissions budget* for greenhouse gases over the same period.

- This global emissions budget then needs to be *allocated between countries*, giving them relative certainty on their emissions entitlements in the medium-term (i.e. over decades).
- In the short-term, meanwhile, policy measures can be implemented that reduce emissions as efficiently as possible (with efficiency defined as a trade-off between speed and cost).
- Finally, emissions must be monitored in as close to *real-time* as possible, providing transparency for all actors and an ongoing assessment of whether or not climate stabilization is on track.

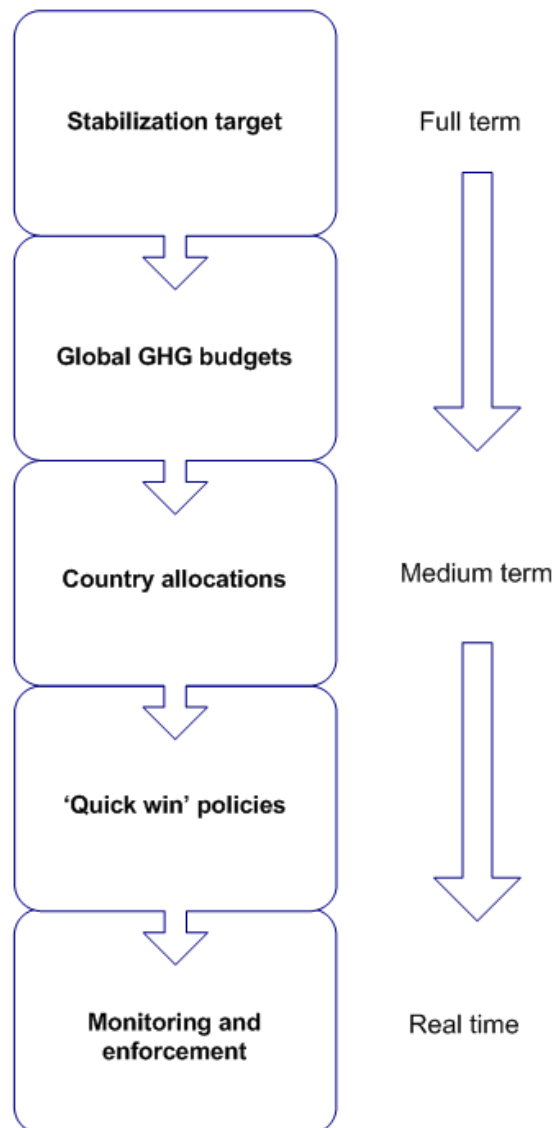


Figure 4

The aim is to create an institutional architecture that is *rules-based* in its construction and *strategic* in its operation. This applies in particular to the allocation of emissions, which will never be set at an appropriate level if countries persist in setting targets

through 'horse-trading', with each country arguing for its own special dispensation. Instead, negotiations need to focus on agreeing the *principles* by which emissions are to be allocated (the 'Algorithm' in our Operating System scenario).

Of course, competing principles for making allocations already exist, and underpin the negotiating positions taken by many countries – but they are seldom articulated fully, or used as the basis for proposing a long-term settlement. Three competing visions can be distinguished:

- On one end of the spectrum, countries such as China and Brazil tend to favour allocations based on historical responsibility for the current stock of greenhouse emissions. This would lead to a punitive settlement for developed countries, especially those that industrialised early.
- On the other, many developed countries start from the assumption that some 'grandfathering' of emissions is the only practical solution. At its most extreme, this would imply a principle of allocating emissions entitlements in proportion to GDP per capita.
- Somewhere in the middle is an equal allocation of future emissions in which historical responsibility and grandfathering offset each other to some kind of reconciliation, perhaps ending with allocations on a per capita basis.

The European Union, for example, has argued that global per capita emissions will need to reach around 2 tonnes CO₂e by 2050, and that this would imply a "gradual convergence of national per capita greenhouse gas emissions between developed and developing countries."³⁰

We concur that, in the long-term, some approximation of equal per capita emissions rights offers the only sustainable basis for gaining agreement from countries with very different levels of development. The key question, of course, is when this process of convergence starts and how long it takes, and how equity is ensured during this period.

Mechanisms for ensuring equity

One problem with a per capita allocation is that it is at once:

- Impossible for developed countries to *deliver* in the short term (their emissions can only drop to average levels over a long period) and hard for them to *accept*, even if convergence is slow (they still have to take deep cuts – especially given that most population growth is in developing countries).
- *Inequitable* for developing countries (they receive a disproportionately small share of emissions in the period during which convergence takes place, and are not rewarded for having low emissions prior to taking on emission targets).

Three mechanisms for increasing equity present themselves:

- Emissions can be treated *a property right*, with emissions trading between countries to ensure compensatory financial flows during the convergence period.
- Resource flows can be directed through *non-market mechanisms* (such as technology transfer) with a treaty or other agreement tying them to development status or emission levels.
- Additional resource flows that *fund adaptation* to the impacts of a changing climate.

The first two mechanisms are linked to mitigation. Both relate to *current* economic or emissions performance and can be logically tied to a *per capita* yardstick, with low emitting countries demanding full property rights over the long term, but receiving resource flows that help to incentivise their participation during any period before these rights are not fully allocated.

Responsibility for providing adaptation finance, meanwhile, should relate to historical *and* current emissions patterns. Countries that have developed earliest should be expected to bear the lion's share in compensating countries suffering the consequences of climate change. Adaptation finance, in other words, can help to compensate for the equity shortcomings of per capita convergence, with its delayed arrival at per capita equity and its failure to account for historical emissions patterns.

Taken together, these mechanisms can be used to institutionalise a 'grand bargain' between rich and poor nations whereby:

- Rich countries gain full and immediate developing country participation in a climate deal, especially from the emerging economies that they see as their greatest competitors – and through emissions trading, also have access to a mechanism that helps them to achieve their targets flexibly and at least cost.
- Developing countries receive compensatory resource flows, through emissions trading, non-market mechanisms and adaptation finance that are tied to their emissions performance.

The result would be a comprehensive framework that would bring together emissions (potentially including carbon sinks as well) and development into a single package. Resources would flow from rich to poor countries through carbon markets, through technology transfer, and through direct support for adaptation. Over time, as Collier, Conway and Venables have argued, the allocation of carbon rights to developing countries and additional support for adaptation could in effect *become* a large part of the aid programme for most developing countries.³¹

Development organisations would meanwhile find that their existing role – supporting and strengthening governments in developing countries to enable them to make the best use of budgetary support – would assume even greater importance, given the likely scale of the financial flows involved. This is discussed further below.

Enforcement mechanisms

Any workable institutional architecture will need systems in place to ensure that commitments are complied with, and in particular, to stop countries outside the system from free-riding on the efforts of others.

This implies a significant pooling of sovereignty, greater coercive powers at international level, and significant investment in surveillance and research. More effective monitoring and enforcement will be needed on four levels:

- First, common *standards and data sources* are needed. This provides the foundation of any enforcement system.
- Second, a system will be needed to set *long-term goals* and refine them according to scientific developments.
- Third, there must be sufficient information *at a microeconomic level* to allow systems to function on an ongoing basis, thus allowing agreements to be set up and enforced.
- Fourth, arrangements must be made to tackle *crime and fraud*, which is to some degree inevitable but which will lead to failure if unconstrained.
- Finally, *at a macro level*, action will need to be taken against countries that fail to meet their obligations or attempt to exit the system.

It seems inevitable that a long-term climate deal will ultimately require an ‘all or nothing’ approach to international participation. Either countries play a full part in the system (and thus have access to international frameworks on finance, trade, development, energy and other resources, and perhaps even security); or they sit outside the international system and are effectively barred from all forms of international co-operation.

Carbon default, in other words, would become as weighty an issue as sovereign default, or failure to comply with a Security Council resolution. That this should currently seem inconceivable indicates the extent of the shift in understanding that is still needed.

Even willing participants in the climate framework, meanwhile, are likely to face a coercive inspections regime, including unannounced inspections, and legal liability both for their emissions and for any emissions permits they purchase through

markets (so-called 'buyers liability'). The result might in practice look not dissimilar to the International Atomic Energy Agency's process of intrusive inspections in countries suspected of developing illegal nuclear weapons programmes.

Developing independent capacity

We have presented a highly simplified model of the functions that will need to be delivered by a future system for climate control. It has three elements:

- Constraints on emissions that are tied to a science-based stabilization goal, and allocated according to an objective and transparent formula or algorithm.
- A commitment to carbon rights, with compensation for countries that receive a disproportionately low allocation of emissions, again using objective criteria.
- Coercive enforcement mechanisms that require all countries to participate in climate control, as part of an 'all or nothing' approach to international co-operation.

This stylised picture helps expose the extent of the institutional challenge that climate control poses. We face a paradox. On the one hand, what is effective is not seen as politically possible. On the other, what *is* currently regarded as politically possible will almost certainly not be effective. So what can be done?

The first priority should be to build on and strengthen the work of the IPCC, recognising that it is still near the beginning of what will be a long-term mission to act as a credible and independent source of knowledge on climate. Through four assessment reports, its findings have gradually pushed governments to consider novel and difficult policy options. Growing understanding of the seriousness of future climate change will be needed if they are to think the unthinkable on an international level.

In the short term, the IPCC should be mandated to report on new scientific findings on a regular basis (probably annually). Full assessment reports should continue to be produced on a regular basis, with the timetable not subject to political interference. Arrangements should also be made to review the IPCC's performance on a regular basis, responding in particular to criticisms from climate scientists and to any challenges to its independence.

The second priority should be to create a robust surveillance function for global performance on carbon control (an International Climate Control Committee), thus creating capacity in areas where the IPCC has a weaker remit. Like the IPCC, this body should be independent of the policy process and have no operational capacity. It should be able to draw on all parts of the international system that have research and surveillance capacity (the IPCC, but also the IMF, World Bank, WTO, etc), but have its own capacity to commission research and audit data submitted to it.

Its remit would be to provide definitive reporting on (i) long or full-term prospects for climate stabilization given current emissions trends; (ii) the impact of any climate control mechanisms on emissions at a global level; (iii) national performance in reducing emissions; (iv) an assessment of the quality of, and gaps in, the data available to the committee, whether at a national or international level. It would thus have a similar mandate to the IMF, which is charged with monitoring economic and financial policies at both global and national level.

Over time (and possibly quite quickly), the ICCC could expand its role to:

- Make recommendations to governments on what stabilization targets should be pursued and what global emissions budgets should be available, both in the long-term and over 5/10 year periods.
- Develop options for the underlying principles for allocating these budgets, the resource flows that would be needed to compensate those who do not receive their full 'carbon rights', and how these resources would be collected (through markets, by quotas or contributions, etc)

The model for the ICCC would be an independent central bank, with devolved powers for setting interest rates in order to achieve an inflation target or band. The institution's design should also draw on recent national moves to set up climate committees that advise governments on carbon budgets and report to parliament on progress.

Reviewing existing institutional mandates

At the same time, we should also be looking to rethink the role of existing international institutions in the light of climate change. Here, the overarching objective should be decisively to break the divide between climate and other global issues, and to work towards a number of new, longer-term deals that are integrated across issues.

For example, the current G20/Bretton Woods II process is exploring the comprehensive reworking of the global economy. Climate stabilization has the same objective. It would thus make sense to build a low carbon track into the G20 process, with two principal strands:

- *Short-term*: a 'green new deal' involving co-ordinated fiscal stimulus that reduces rather than increases carbon.
- *Medium to longer-term*: devising institutional mechanisms for (i) effectively regulating carbon markets in a way that guarantees their integrity, while protecting the rest of the economy from their potential breakdown/volatility; (ii) agreeing long-term investment frameworks for new technologies (based on an

understanding of where market failures will persist, despite the application of a carbon price); (iii) developing robust methodologies for investing in carbon sinks.

Another area where climate linkages need to be explored and integrated more fully is trade, and the critical question of what comes after the Doha round. As the last section noted, carbon is effectively embodied in trade – in terms of both transport costs and the carbon accounting used to quantify greenhouse gases emitted in one country to manufacture goods consumed in another. Meanwhile, improved access to the global trade system remains a key demand for many developing countries.

The institutional role of the World Trade Organisation in such matters has barely begun to be thought through. At the same time, exploration of this linkage implies real opportunities. Low carbon trade areas, or new arrangements for intellectual property in low carbon technologies, are just two examples. The possible utility of the trade sanctions regime as a way of enforcing a future climate deal is another potentially rich avenue of investigation.

Third, there is a need to rethink the international development policy agenda in light of climate change, including a reconsideration of what should be the core objectives for international donors:

- Without rapid action on climate change, its role will be to do whatever can be done to limit the damage caused by sizeable and ongoing temperature changes.
- With rapid action on climate change, meanwhile, the global economy will change the way it functions at a quite unprecedented pace, fundamentally altering the context within which developing countries must operate, while mitigation policies are likely to provide these countries with a new source of financial and other resource transfer.

Either way, the prospect is for a vision of development that has resilience much more at its core – whether that is resilience to runaway climate change, or to the novel demands of a low carbon world. Even if the climate is stabilized, moreover, the world will still be committed to a significant amount of warming. There is thus an unavoidable need to focus on adaptation and to bring it into the mainstream development agenda.

However, adaptation is easier said than done – largely because while there is a large body of research on what climate change will mean at the global level, much less is known about how climate change will affect specific countries or communities. The situation is further complicated by the fact that it is hard to attribute specific effects definitively to climate change: for example, while climate change will lead to water scarcity in South Asia, there are also plenty of other such drivers (such as unsustainable water use for inefficient irrigation systems).

Finally, there is yet another degree of complexity in that the most significant impacts from climate change on individual people may result less from direct impacts (such as floods, droughts, sea level rise and so on) than on what can be termed the 'consequences of consequences': indirect impacts on livelihoods, health, conflict risk, social exclusion, migration and so on.

One key question in all this is of course about how much adaptation in this broader sense is likely to cost. The UNFCCC Secretariat has estimated that US\$28-67 billion will be needed to meet the cost of adaptation in developing countries by the year 2030; the World Bank estimates \$10-40 billion a year (without citing a timetable); and the UN Human Development Report has estimated the figure at an annualised requirement for \$86 billion.

However, the methodological challenge that all of these estimates share is that as one moves from specific actions to meet the acute effects of climate change towards the broader challenge of 'mainstreaming resilience', it becomes harder to specify in detail how much of the financing requirements are genuinely additional, and how much of them, on the other hand, pertain to *spending current aid flows differently*.

In this sense, it is perhaps questionable whether it even makes sense to think of the 'price tag' for adaptation. A better approach, on the other hand, might be to recognise that the time has come to have a broader strategy review on development finance generally. After all, the financing considerations arising from climate change are just one of the ways in which the finance for the development landscape has altered fundamentally over the last decade or so. A further transformative driver has been the explosive growth in migrant workers' remittances; another has been the emergence of new aid donors, notably philanthropic foundations; yet another has been the profusion of shifts associated with the emergence of the BRICs and other rapidly industrialising economies, which has led to a diminution in their need for concessional finance (although the credit crunch may now be reversing this) and to their own assistance programmes in least developed countries.

The need to take stock of these and other shifts in the context for finance for development is beyond the scope of this paper – as is the qualitative equivalent of asking what Poverty Reduction Strategy Papers and other national development plans would look like if they took as their core priority the need to build social, economic and political resilience in a world hallmarked by increasing risks (of which climate change is but one example).³²

As discussed above, development agencies will also need to focus increasingly on institution building. Part of this effort will be nationally focused, but there must be an international dimension too if developing countries are to play a full role in the design of any new climate system.

Summary

Climate change is likely to be the central shaping factor in foreign policy over the next few decades, and in this sense it can perhaps be compared to the Cold War – arguably the central shaping factor in foreign policy from 1945 to 1990.

During this period, the Cold War drove enormous institutional innovation within and between governments – from NATO and the Warsaw Pact in the early years, to arms control agreements like SALT and START that came decades later. These were not merely new institutions; they were new *kinds* of institution, built for a new kind of global challenge (i.e. strategic competition between superpowers in a nuclear age). Yet underneath all this innovation, governments were maintaining the same basic national security functions as before the Cold War started: pursuing national interests overseas and protecting domestic interests from strategic rivals.

Today, climate change requires a similar process of radical institutional innovation, which will have far-reaching implications for *all* kinds of international organisation. Recent United Nations High Level Panels have begun the process of imagining a very different international system. But their work can only be the start, given the scale of the challenges we face.

FIVE ! GETTING FROM A TO B

In a recent paper on global institutional reform for the Progressive Governance Summit, we set out a number of aims for a new multilateralism, including to:

- Move beyond short-termism, to develop comprehensive systems for managing risk.
- Embed national sovereignty in a deeper context, in which the need for cooperative action between states is recognised and acted upon.
- Overcome fragmentation between silos, without falling into the trap of over-centralisation.
- Cope with the unexpected, so that breakdowns can lead to renewal rather than collapse.
- Distribute, as widely as possible, the burden of creating global public goods, while allowing like-minded actors to forge ahead with new approaches.

Delivery of the new multilateralism requires an attempt to construct ‘shared operating systems’ that allow us to manage transnational risks and produce global public goods. For climate, we have argued that the main elements of this system are science-based stabilization targets, carbon rights, compensatory resource flows, and strenuous enforcement. We have also begun to outline the independent, rules-based institutions that would be needed to make this system work.

The gap between the multilateralism we have and the multilateralism we need is immense, however. Moreover, there is currently little political space for exploring radical, but necessary, solutions. Those who are committed to climate stabilization, therefore, need to focus their energy on:

- Creating *shared awareness* – building deep consensus around the need for far-reaching change and a set of detailed blueprints for reform.
- Constructing *shared platforms* – developing networks of state and non-state actors who are prepared to work together to create the political conditions in which reform is possible.

The aim should be to move outside the Copenhagen process to build a coherent *grand strategy* that brings competing blocs together, develop a compelling and overarching *narrative* that gives leaders the confidence to make creative, game-changing moves, and start to build the *public pressure* that will allow governments to forge common ground.

What, then, are some of the ways in which shared awareness and platforms can be built? Here, in conclusion, are four key recommendations for ways to invest in shared awareness on climate change in the international system.

1. A Stern Review on institutional renewal for climate and the global economy

As policymakers tackle the immediate crises of the credit crunch and consequent global economic downturn, key multilateral summit processes – especially the G20/London Summit process and the G8 process – are starting to explore the need for a comprehensive reworking of the global economy. Climate stabilization requires the same objective – even if actions to mitigate the downturn and actions to mitigate emissions do not necessarily overlap in practice.

To date, the short-term focus of the G20 and G8 processes (and in particular the fact that finance ministers and ministries are so overloaded) has meant that their current agenda extends no further on climate change than proposals for ‘green new deals’, involving co-ordinated fiscal stimulus that reduces rather than increases carbon. This, however, should be seen only as a first step towards integrating the global deals on the economy and on climate.

Beyond this, the G20 and/or G8 leaders should initiate a high-level analytical process on global economic reform, with climate change explicitly identified as one of the core pillars of the Panel’s terms of reference. Such a process would seek to explore the linkages between climate and other economic areas, with the aim of bringing a more coherent perspective to bear on the issue.

One example of an area where climate linkages need to be explored and integrated more fully is trade. As the last section noted, carbon is effectively embodied in trade – in terms of both transport costs and the carbon accounting used to quantify greenhouse gases emitted in one country to manufacture goods consumed in another. Meanwhile, improved access to the global trade system remains a key demand for many developing countries.

The institutional role of the World Trade Organization in such matters has barely begun to be thought through. At the same time, exploration of this linkage implies real opportunities. Low carbon trade areas, or new arrangements for intellectual property in low carbon technologies, are just two examples. The possible utility of the trade sanctions regime as a way of enforcing a future climate deal is another potentially rich avenue of investigation.

Another example is the inter-relationship between climate, energy and food prices, all of which can be understood as ‘scarcity issues’. While the commodity price spike of 2008 has abated to some degree, long-term drivers suggest that prices will resume their bullish trajectory. The International Energy Agency has already warned that the current collapse in oil prices is leading to acute under-investment in bringing new

production on stream, setting the stage for a potential supply crunch as the world emerges from the economic downturn.

In such a scenario, food prices would be likely to follow oil prices upwards (through transmission mechanisms ranging from input and transportation costs to biofuels). The resulting combination of energy and food inflation would pose acute problems for many poor countries and for millions of poor people. But while the energy-food convergence implies that investment in new oil production is a top priority, there is still the need to reconcile this against the needs of climate policy.

At present, as we saw earlier in this paper, the institutions responsible for these three issues proceed with only minimal reference to each other; it certainly could not be said that the international system takes a coherent approach to scarcity issues. Here too, the first step towards a better co-ordinated approach would be a thorough analytical process, with a clear mandate to 'join the dots' between formerly single issues that are now in the process of merging into an over-arching challenge of global political economy.

2. Increasing the 'bandwidth' of the multilateral summit process

If one challenge is the need to generate new ideas about institutional reform, then another requirement is the need to equip multilateral summit processes better to agree and implement such ideas.

While recent years have seen an increasing trend towards challenging foreign policy issues being delegated upwards to leaders' level, their track record of action at summit meetings is limited at best. The past decade of G8 summits, for example, has seen a tendency towards media-friendly 'initiatives' rather than comprehensive action plans on global issues. Even where important agreements have been reached at G8 summits – for example on developing world debt relief, on the Proliferation Security Initiative or the Global Fund on AIDS, TB and Malaria – such agreements have almost never involved domestic implementation commitments beyond funding pledges.³³

Moving towards the kind of far-reaching international institutional reform that this paper has argued is necessary for tackling climate change effectively, is likely to depend on significantly improved multilateral decision-making within summit forums such as the G8, the G20 and ad-hoc groupings such as the heads' level climate change summit organised by the UN Secretary-General in 2007. Yet while debates about the effectiveness of such bodies have tended to focus on the question of which countries should be represented on them, an equally significant issue is whether the bodies in question have adequate processes in place for preparing and managing the summit agenda.

At present, many summit processes are heavily constrained by the limited 'bandwidth' of the sherpa system that prepares the agenda in advance of summits.

While sherpas have the advantage of being seen to enjoy strong access to their leaders, they also tend to have very busy 'day jobs' (Permanent Secretary to the Ministry of Foreign Affairs is a typical example), meaning that they meet only a few times before a summit – a configuration that inevitably pushes them towards 'initiatives' rather than comprehensive action.

One possible way of increasing the bandwidth of summit processes would be to develop a permanent secretariat for each of the key leaders' bodies (the G8, the G20, and so on). However, while this approach would certainly create additional capacity, the problem with it would be that leaders would be unlikely to assent to, or trust, a semi-independent organisation that could come to have its own policy agenda. (The OECD, for example, is often happy to criticise its members publicly, as in the case of the UK's questionable adherence to OECD anti-corruption standards.)

However, an alternative means of creating additional bandwidth for climate change summitry might be to create a system of Permanent Representatives around the G8, the G20 or indeed a new leaders' forum. To illustrate what such a system might look like, consider the example of the UN Security Council in the conflict and security context. The Council is the pre-eminent global decision-making forum in this policy area, and meetings at heads' level are complemented by more regular meetings between their Perm Reps – who, as very senior diplomats, enjoy political access at home comparable to that of a G8 sherpa. The same applies within the European Union, where meetings of heads in the European Council are matched by more regular meetings between Brussels Perm Reps.

Admittedly, global economic issues will often come with more extensive domestic implementation angles than the Security Council agenda typically does, and this would probably require full time sherpas or economic Perm Reps to spend a significantly higher proportion of their time in their capitals than is the case for Permanent Representatives to the UN in New York.

But even if sherpas on a global leaders' forum were to divide their time on a 50/50 basis between time in their respective capitals and time with each other, the net effect would be to increase greatly the bandwidth of the system, its capacity to deal with complex issues and above all the shared awareness between national governments of each other's positions. As the need for cross-issue synthesis grows, and as the role of leaders therefore increases in importance, a Perm Rep system for international economic issues could yield significant progress.

3. The centrality of public engagement

In many ways, progress towards far-reaching institutional renewal on climate change can be understood as a game that will have the opposite dynamic to chess. Any sustainable endgame on climate change will necessarily involve cuts in emissions

that will be painful for some, at least in the short-term. This means that as the game moves towards its conclusion:

- The number of pieces on the board will grow, not shrink.
- Latecomers will be narrowly focused on their objectives.
- Latecomers will also often have a narrow understanding of the issue.

As a result, the game becomes more complex as it progresses, while progress is exponentially more difficult to achieve the nearer an agreement becomes. Ratification will prove especially testing, as at this point, a single international 'game' will fragment into many domestic ones, and each of these domestic games will tend to be more inward-looking and narrowly focused.

Public engagement is therefore paramount. At present, to a surprising (and alarming) extent, international climate policymakers act as though what takes place in the climate 'bubble' is the key determinant of success.

But in fact, recent experience underlines the extent to which publics matter in foreign policy. The European Constitution and its successor, the Lisbon Treaty, were both examples of agreements where policy elites successfully reached a bargain, but then found it bluntly rejected during the ratification phase by publics who had been largely excluded from earlier deliberations. Many other international institutions struggle with public apathy or antipathy towards them.

Accordingly, it will be essential for policymakers to engage early in the process with non-state constituencies – not only to gauge what public opinion is likely to bear, but also to build a broader sense of buy-in in order to prevent catastrophic public-driven 'wild cards' from defeating agreements late in the process. Yet it is astonishing how little governments and international agencies are actually doing to prepare publics for the prospect of a far-reaching global deal on climate change – particularly given that such a deal will, after all, be designed to catalyse a massive change in public behaviour.

Experience suggests that making this investment now could lead to significant yields. If the failure of the European Constitution provides an example of a large-scale failure of public engagement, then a good example of success is the campaign in favour of the creation of the United Nations that the US State Department organised while World War II was still being fought.

Hundreds of thousands of copies of the Dumbarton Oaks proposal were printed and circulated; State Department officials attended hundreds of meetings all over the country. Today, pamphlets and meetings have been overtaken by new ways of engaging publics (as Barack Obama's election campaign, with its hugely successful

use of new social networking technologies, attests), but the underlying nature of the game remains the same.

4. A fair institutional deal for developing countries

Developing countries and poor people depend most of all on effective international cooperation on climate change, given where the impacts will fall and that poor countries have the least capacity to adapt. At the same time, the converse applies as well: international cooperation very much depends on developing countries. No global solution to climate change is realistic if it fails to include at its core developing countries, and above all, the key emerging economies. At present, such a global solution seems a long way off – principally because of the apparent impossibility of initiating a serious discussion about the question of emission limits for developing countries. So how might the political context for such a discussion be made more auspicious?

A key starting point is the need to recognise that although the G77 group of developing countries remains a key reference point in international climate negotiations, developing countries are today further than ever from being a homogenous group.

- Emerging economies such as China and Brazil have made clear that their key policy priority is to maintain high growth rates – and that on this basis, they are (for the time being, at least) opposed to accepting any caps on their capacity to emit greenhouse gases as they develop. These countries also recognise for the most part that they are unlikely to receive significant financial flows to help them to adapt to the impacts of climate change, but they do often have specific asks on technology transfer and support for research and development.
- The small island developing states (SIDS), who are in the front line of climate change, stress the urgency of adaptation support and are also among the most vocal advocates of aggressive action to curb emissions and limit warming to 1.5°C.
- Other low income countries are also strongly focused on securing financial support for adaptation, and are at the same time suspicious of calls to ‘mainstream’ adaptation work throughout wider development plans, in part because of fears that this will lead to onerous conditions being attached to finance flows. They are mostly less concerned about mitigation scenarios than are small island states.
- Finally, a small group of countries such as Saudi Arabia acts as ‘spoilers’ within the G77 and the wider negotiating process because of an assessment that they are likely to be net losers from an effective global climate regime.

Overall, then, developing countries as a whole are largely *hanging back* from engaging with the fundamental political questions associated with stabilization and how a global emissions budget would be shared out, in part because all of the sub-groups within the G77 have higher priorities within the climate process than discussing stabilization. The same trend of hanging back is also discernible in the domestic context, where most developing countries have done relatively little to develop the institutions that will be needed to increase resilience or support low carbon growth.

Developing countries' willingness to hang back from discussing long-term institutional issues on climate change reflects a comparable trend in other areas of global economic governance and foreign policy. For example, while the question of G8 reform or enlargement has been topical within G8 member countries in recent years, the emerging economies represented in the +5 'outreach group' have often professed themselves less concerned, and willing to play a longer game. As Yu Yongding of the Institute of World Economics and Politics at the Chinese Academy of Social Sciences observed in a 2004 paper, for instance, "China sees no necessity to join in the G7 at this moment even if it were to be invited ... China does not want to bear the responsibility that is not its to bear".³⁴

To be sure, a strategy of hanging back may well make sense for developing countries (and especially emerging ones) in many contexts. As emerging economies become richer and as their economies grow, they can naturally expect their political and economic clout to grow; accordingly, delaying discussions of far-reaching institutional reform will allow many developing countries to increase their influence in the meantime.

Climate change, however, is the exception to this rule. In part this is simply because the longer the world continues without a comprehensive emissions control framework, the higher GHG concentration levels will climb, and the more developing countries will be in the firing line. (Current emissions pathways imply a very high eventual stabilization and warming that may be above 4°C, not below 2°C. This implies massive climate impacts, severe reduction in countries' ability to develop, and a marked deterioration in security as well – all factors that will affect developing countries disproportionately.)

A delay in agreeing a comprehensive framework is also negative for many developing countries because of the risk that they will be left facing exactly the scenario they fear: developed countries 'pulling the ladder up after them'. A succession of short-term commitment periods would have the effect of allowing developed countries to emit more now, leaving fewer emissions for the future if a given stabilization pathway is to be achieved. Developing countries' eventual share of emissions (combined with compensatory resource flows) is therefore likely to be smaller, the longer a comprehensive global deal is delayed.

But all of this still leaves open the question of which developing countries are likely to push for early discussion of a comprehensive deal, given the positions of different sub-groups set out a moment ago. The ‘spoiler’ group is unlikely to change its position; the emerging economies, meanwhile, seem likely to remain preoccupied for the time being on the immediate effects of the global downturn rather than on the longer-term shape of a global climate deal.

The one group that arguably has more of a stake in pushing for serious discussion of a binding stabilization target and the distribution of a formal global emissions budget, however, is low income countries (including both small island states and LICs more broadly).

To see why, consider the financial flows that might be involved in a fully global emissions trading system in which permits were allocated on an equitable basis as in the ‘Algorithm’ scenario discussed earlier in the paper. Since low income countries have more or less uniformly low per capita emissions, they could expect to be net sellers of emission permits for years to come, even in tightly constrained global emission budgets. As Collier, Conway and Venables have argued, the allocation of carbon rights to developing countries could in effect *become* the aid programme for many developing countries – and one that would come without conditions and be fully under national control.³⁵

In such a situation, then, low income countries’ demands for massively scaled up financial flows to meet the Millennium Development Goals could in effect be met through their agreeing to participate in global climate targets. Moreover, a serious signal from low income countries that they would be willing to take on targets – given an equitable allocation mechanism – could have a transformative effect on the political context for institutional reform, in particular given that emerging economies would no longer be able to use ‘G77 solidarity’ as a way of avoiding a serious discussion about the need for them to take on emission control commitments.

Of course, such a proposal would come with real risks and pitfalls. One risk would be that developed countries might simply take no notice: this was more or less what happened in the summer of 2007, when Indian Prime Minister Manmohan Singh indicated India’s willingness to take on quantified targets if allocated under a ‘contraction and convergence’ scenario, but found his proposal largely ignored or overlooked by developed countries. However, given the arguably more auspicious current context of a new US Administration and the increasing salience that the Copenhagen talks will be likely to accord to climate change, it may well be time for another try.

Another risk is the possibility that huge new resource flows without strings attached might present a new kind of ‘resource curse’ akin to that experienced by many poor countries with large endowments of oil or precious metals, or alternatively that these resource flows would not be targeted on the basis of need. These challenges are

harder to dismiss – but ultimately the bottom line is likely to remain that if developing countries are regarded as having their own claim on ‘atmospheric property rights’, as climate change demands that they must, then it is hard to see that developed countries have either the right or the capacity to insist on conditions on how such rights be traded.

Overall, however, the opportunities outweigh the risks. At present, concerns over equity for developing countries are effectively acting as a logjam in the international climate process – even though an increasing number of development experts believes that climate change represents perhaps the most fundamental long-term threat to poverty reduction.

Yet the potential exists for low income countries to transform the situation – securing increased flows of finance for development at the same time as stabilising the climate. It is in integrated approaches like these that the challenge of building institutions to secure sustainable development in the 21st century will be met.

CONCLUSION

In this paper, we have argued that:

- Strong institutions are fundamental to climate stabilization, providing ‘signals from the future’ powerful enough to reshape human behaviour in the present.
- The current architecture for climate change is not able fully to discharge today’s requirements, let alone the more ambitious functions of a properly comprehensive climate settlement.
- Without a process of fundamental institutional reform, any negotiating ‘success’ at Copenhagen or a later climate summit is likely to prove illusory, offering the worst of all worlds – a deal that cannot be delivered.
- An effective institutional architecture must embody a coherent goal, be credible in its discharge of key functions, and be resilient for the long periods of time it will take to stabilize the global climate.
- Objective, transparent and fair mechanisms for distributing the burden of climate stabilization are needed if an institutional architecture is to be effective in the long-term.
- Institutions based on arbitrary or expedient criteria, in contrast, will be neither effective nor lasting.
- The fundamental functions of an institutional architecture are to constrain emissions in line with scientific understanding, ensure equity in responsibility for both mitigation and adaptation, and to have sufficiently strong enforcement mechanisms to ensure participation and compliance.
- In the long-term at least, equity is likely to mean *per capita* rights to emit, combined with support for adaptation based on historical and present emissions. In the shorter term, resource flows may be needed to compensate those who lose out in a less equitable system.
- New types of institution will be needed, for example to adjust the global carbon budget and allocate it to countries based on agreed criteria. These institutions will lead to significant changes in scope and power of the international system.
- The mandate of existing institutions will need to be reviewed. One consequence of this will be significant changes in governance in other areas such as trade, international development and the regulation of the global economy.
- Achieving the required institutional transformation is a daunting task. Progress can only be made through ambitious, but painstaking, attempts to build

consensus around a blueprint of reform, and the coalitions needed to move towards implementation.

Our final conclusion is to note how little work has yet been done in this area. This is a worrying sign. Unless we have a better understanding of the scale and nature of change needed to deliver a low carbon world, then we are poorly equipped to embark on the transformation.

Thanks to a huge and sustained investment in climate science, we have a growing grasp of the climate *problem*. That knowledge will be in vain, however, without a similar dedication to developing, debating and agreeing climate *solutions*. We probably have less than a decade to limit global warming to less than 2 degrees – and less time than that to design the institutions of the post-carbon age.

REFERENCES

¹ At the launch of the Stern Review, Sir Nicholas Stern described climate change as “the greatest market failure the world has seen”, Nicholas Stern, *Stern Review: Economics of Change*, HM Treasury and Cabinet Office, London, 2006. Scott Barrett, meanwhile, has argued that “climate change may not be the most important problem the world has ever faced, but it is certainly the greatest challenge for collective action.” Scott Barrett, *Climate Treaties and the Imperative of Enforcement*, in *Oxford Review of Economic Policy*, Volume 24, Number 2, 2008, pp.239-258. For a discussion of the dynamics of consent and public involvement, see Alex Evans and David Steven, *Climate Change: the State of the Debate*, paper prepared as part of the London Accord Report, December 2007.

² Douglass North: “Successful political/economic systems have evolved flexible institutional structures that can survive the shocks and changes that are a part of successful evolution. We do not know how to create adaptive efficiency in the short run.” Douglass C North, *Economic Performance Through Time*, The Sveriges Riksbank Prize in Economics Sciences Prize Lecture in Memory of Alfred Nobel, 9 December 1993. See also Eric D Beinhocker, *The Origin of Wealth: Evolution Complexity and the Radical Remaking of Economics*, Harvard Business School Press, Cambridge MA, 2006

³ See Evans and Steven, *Climate Change: the State of the Debate*, 2007 op cit, on the role played by the IPCC in creating an ‘anchor’ for debate on the climate problem.

⁴ Stern, *Stern Review*, 2006, op cit.

⁵ Alex Evans and David Steven, *A Bretton Woods II Worthy of the Name*, November 2008

⁶ Douglass C North, *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge, 1991

⁷ Robert Axelrod, *The Evolution of Cooperation*, Basic Books, New York, 1984

⁸ North refers to this as a ‘true model’ – one whose outcomes are as consistent with intentions as is possible given imperfect information about the future, and thus a substantial degree of unpredictability. Effective institutions are built on models that prove, over time, that they are able to deliver desired results despite this unpredictability. North, *Institutions, Institutional Change and Economic Performance*, 1991, op cit

⁹ See Alex Evans and David Steven, *Shooting the Rapids: multilateralism and global risks*, for the Progressive Governance Summit, April 2008, for a full discussion of this concept.

¹⁰ Peter Schwartz, *The Art of the Long View*, John Wiley & Sons, Chichester, 1998

¹¹ See International Energy Agency, *World Energy Outlook*, OECD/IEA, Paris, 2008, for a discussion of low carbon investment needs. For a 550ppm stabilization target, it estimates an additional global requirement of 0.24% of world GDP each year between 2010 and 2030. For a 450ppm target, this rises to 0.55%. The IEA notes very slow rates of capital-stock turnover in some industries (energy, steel etc.), with early capital retirement needed in its 450ppm scenario. The cost of delay is substantial as newer stock will have to be replaced in order to reach any given target.

¹² The following narrative scenarios were particularly useful: *Shell Energy Scenarios to 2050*, Shell International, 2008; *Global Trends 2025: A Transformed World*, National Intelligence Council, 2008. In addition, we have drawn on quantitative scenarios from the IEA and OECD: *International Energy Agency, World Energy Outlook*, 2008, op cit; and *OECD, Environmental Outlook to 2030*, OECD, Paris, 2008

¹³ David Steven, *A Low Carbon World – pathways to a global deal*, speech to the United Nations University G8 Symposium, 4 July 2008

¹⁴ Kevin Anderson and Alice Bows, *Reframing the climate change challenge in light of post-2000 emission trends*, *Philosophical Transactions of the Royal Society*, Royal Society, 2008

¹⁵ For example, a rough estimate suggests that in 2008, the world will spend \$13.1 billion on climate finance, \$90.7 billion on aid and \$4.1 trillion on financial bailouts. See Sarah Anderson, John Cavanagh and Janet Redmond, *Skewed Priorities: How the Bailouts Dwarf Other Global Crisis Spending*, Institute for Policy Studies, 24 November 2008

¹⁶ The quote is taken from the text of the convention.

¹⁷ For a strong and effective critique, see Dieter Helm, *Climate-change policy: why has so little been achieved?* *Oxford Review of Economic Policy*, Volume 24, Number 2, 2008, pp.211–238

¹⁸ *United Nations Framework Convention on Climate Change, Status of Ratification*, last modified 22 August 2007

¹⁹ The IEA estimates that public investment in energy research and development is currently half of the level of 25 years ago. “While many governments have made commitments to increase investment,” it

comments, "much of this has not yet materialised and what has been done is relatively modest in ambition." International Energy Agency, World Energy Outlook, 2008, op cit;

²⁰ *ibid*

²¹ William Nordhaus, *A Question of Balance: weighing the options on global warming policies*, Yale University Press, New Haven, 2008

²² International Energy Agency, World Energy Outlook, 2008, op cit

²³ Dieter Helm, *Climate-change policy: why has so little been achieved?* 2008, op cit

²⁴ Jiahua Pan, Jonathan Phillips and Ying Chen, *China's Balance of Emissions Embodied in Trade: approaches to measurement and allocating international responsibility*, in *Oxford Review of Economic Policy*, Volume 24, Number 2, 2008, pp.354-376

²⁵ Scott Barrett, *Climate Treaties and the Imperative of Enforcement*, 2008, op cit

²⁶ 'In Bali – radical comments', David Steven, *opendemocracy*, 15 December 2007, available online http://www.opendemocracy.net/global_deal/ambitious_deal

²⁷ WWF and Allianz, *G8 Climate Scorecards*. World Wide Fund for Nature, Switzerland, online

²⁸ The World Bank Institute, *State and Trends of the Carbon Market 2008*, The World Bank, Washington, 2008

²⁹ United Nations, *A More Secure World: our share responsibility*, Report of the Secretary-General's High Level Panel on Threats, Challenges and Change, 2 December 2004

³⁰ European Commission, *Submission by France on Behalf of the European Community and its Member States*, Fourth session of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention, Paris, 14 November 2008

³¹ Paul Collier, Gordon Conway and Tony Venables, *Climate Change and Africa*, in *Oxford Review of Economic Policy*, Volume 24, Number 2, 2008, pp.334-353

³² Alex Evans and David Steven, *Risk and Resilience in the New Global Era*, in *Renewal*, Volume 17 No. 1, February 2009

³³ Alex Evans, *A New Global Leaders' Forum? – Comparing and Evaluating Recent Proposals*, Center on International Cooperation, 2007

³⁴ Yu Yongding, "The G20 and China: a Chinese Perspective", paper prepared for L20 project, 2004 – available at http://www.l20.org/publications/23_Bx_g20_ottawa_yongding.pdf

³⁵ Paul Collier, Gordon Conway and Tony Venables, *op. cit.*

Global climate change is the ultimate global-commons problem, with the relevant greenhouse gases mixing uniformly in the upper atmosphere, so that damages are independent of the location of emissions. Because of this, a multinational response is required. To combat the risks posed by climate change, efforts that draw in most if not all countries over the long term will need to be undertaken. This focus on climate policy architecture reflects the need to establish a foundation of policy principles and institutional infrastructure to inform and frame multilateral and national actions. Richard Schmalensee highlighted the need for a long-term policy architecture in his 1998 review of the Intergovernmental Panel on Climate Change's assessment of policy instruments. Strengthening institutional climate capabilities (see policy brief). Introduction. This paper* focuses on the challenge of strengthening institutions' capacity to understand and address the impacts of climate change on development. It offers insights from practical experience from the Action on Climate Today (ACT) programme and introduces a framework for building capabilities that can inform initiatives seeking to enhance adaptation across different contexts. The ACT programme is helping mainstream climate change resilience measures within budgetary planning and policy-making across South Asia Mapping the Institutional Architecture of Global Climate Change Governance. 7. Preface. This report is an updated version of the technical report "Mapping the Institutional Architecture of Global Climate Change Governance" published on 13 August 2015 (Dias, Guerra et al. 2015). It includes a revision of institutions included in the data-set, where. Mapping the global climate change governance architecture involved two stages of data collection: (1) transnational institutions "relying on a review of previous case studies (in particular Bulkeley et al. 2014; Hale and Roger 2014; Hoffmann 2011), the Climate Initiative Platform (<http://climateinitiativesplatform.org/>), the Non-State Actor. Zone for Climate Action (NAZCA, <http://climateaction.unfccc.int/>); and (2) inter-state.