

**A New Global Climate Change Treaty –  
Can Humanity Deliver?  
Our Challenge after Durban for 2015**

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## **Abstract**

The international community has grappled with the challenge of mitigating human-induced climate change for more than two decades. But progress thus far has been modest. Several international agreements have been negotiated and ratified, but their effectiveness has been limited; globally, greenhouse gas emissions have continued to rise. In December 2011, at a major UN conference in Durban, South Africa, the international community agreed to commence negotiations with the aim of crafting a new global climate policy regime by the end of 2015, with entry into force by 2020. Under the new framework, all major emitters – including the US, China and India – will be bound for the first time by similar legal obligations (albeit in the context of differentiated emission reduction targets to reflect national circumstances). But can agreement be reached on a new, comprehensive and environmentally effective treaty? There can be no guarantee. There are deep divisions between the key parties; the political constraints facing negotiators are severe; the findings of the mainstream science remains under constant attack from powerful vested interests and climate change sceptics; and economic, rather than environmental, issues dominate the world's attention. Moreover, large global emission reductions are required within a few decades if significant additional warming is to be avoided. Can humanity rise to the challenge or will future generations be confronted with an inhospitable climate and huge adaptation costs?

## The Problem

Several years ago, the Secretary-General of the United Nations commented: 'climate change, and what we do about it, will define us, our era, and ultimately the global legacy we leave for future generations' (Ban Ki-Moon, 2007). Ban Ki-Moon is utterly correct: human-induced climate change represents one of the great moral and political challenges of our times; it is a defining issue. If we fail to meet the challenge, the implications for our children and grandchildren and many future generations beyond are grave. In short, there is a high risk that unconstrained climate change will cause severe, widespread and irreversible damage to key biophysical systems. For humanity, the long-term economic and social costs will be huge. For the rest of the biosphere, there is the prospect of mass extinctions resulting in a vast loss of biodiversity; understandably, some have termed this 'ecocide'.

We have few excuses. Many have understood what we are doing to the atmosphere and their potential consequences for a long time. In 1957, Roger Revelle and Hans Suess (1957) observed that: 'human beings are now carrying out a large scale geophysical experiment of a kind that could not have happened in the past ... Within a few centuries we are returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years'. The question now is whether we can abort this very risky experiment or whether future generations will be confronted with a much less hospitable climate and potentially massive adaptation costs?

In the midst of the gathering storm, there are some shafts of light. In Durban, South Africa, in December last year, the international community agreed to commence negotiations with the aim of crafting a new 'protocol, another legal instrument or an agreed outcome with legal force under the [climate] Convention' by the end of 2015, with entry into force by 2020 (UNFCCC, 2011a). Under the Durban Platform for Enhanced Action, as it is called, it is intended that all major emitters of greenhouse gases – including the US, China, India, Indonesia and Brazil – will be bound for the first time by similar legal obligations, albeit in the context of differentiated responsibilities to reflect national circumstances. The aim, in other words, is to move beyond the current artificial division of the world into two blocs – developed and developing – and to broaden participation so that there are no significant free riders. Under the plan, the US will no longer be outside the global mitigation tent; nor will the major developing countries be free of mandatory obligations to limit their emissions. The so-called 'firewall' between the North and South will be dismantled. Instead, it is intended that the new legally-binding policy architecture will have common rules for all.<sup>1</sup>

But negotiating a new, comprehensive and environmentally effective treaty will be difficult. Consider the following analogy: imagine that, after much effort, a global convoy of vessels has come together and

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<sup>1</sup> For varying perspectives on the Durban conference see: Boyle, 2011; Climate Institute, 2011; Sterk, et al., 2011.

embarked on a long voyage. All accept that the voyage is necessary and are reasonably confident about the general direction to sail. But the convoy faces numerous obstacles. There is no agreed final destination. The seas ahead are only partially charted. All available routes are complicated and risky. Each captain is operating under separate orders. There is no unified command structure. Those in the best position to provide leadership have little incentive to do so or are under strong pressures to leave the convoy. Some of the ships are super-tankers; they are not only hard to steer, but there are also many hands on the tillers and they are pulling in opposite directions. The members of the convoy are deeply divided about how to work together and what help to give each other. There are no simple, obvious or broadly acceptable solutions. The convoy is restricted to the speed of the slowest participants, but the slower the convoy travels the greater the risk of the seas becoming treacherous.

I wish this analogy was a complete exaggeration. But it is not. Unfortunately, as the distinguished Australia economist and diplomat, Ross Garnaut (2008), has observed, climate change is a 'diabolical' problem. Equally, and in technical terms, it can be classified as a 'super-wicked' policy problem. A super-wicked problem has the following characteristics: the policy is complex and controversial, with competing problem definitions; all the available solutions are problematic; delay is costly; those most responsible for the problem have the least incentive to help solve it; and the central control or enforcement mechanisms are weak.

To be more specific: of the many obstacles to a new and effective climate treaty, the following ten deserve mention:

1. First, climate change is a collective action problem: humanity has a collective, long-term interest in reducing global emissions, but there are powerful short-term reasons for every country to free ride and do as little as possible. This is because reducing emissions imposes short-term costs on citizens, such as higher fuel prices. Most citizens are voters. The future generations who stand to gain from action today do not have a vote; they depend on our foresight and goodwill.
2. Second, there are powerful vested interests ranged against effective global action. Those who profit from the use of fossil fuels have little interest in decarbonizing the global economy; and they are prepared to spend a great deal to protect their investments. Related to this, many of the countries that are central to the successful quest for a new global agreement have large, powerful fossil-fuel sectors – Australia, Canada, China, Russia and the United States. This has major implications, both for the domestic politics of climate change and for the international negotiating environment.
3. Third, much of the world's energy-related capital stock – including power stations and other infrastructure – has a very long economic lifetime. This creates a huge degree of path

dependence and thus long lags in the decarbonisation process. In other words, large-scale CO<sub>2</sub> emissions are more-or-less locked in for decades to come (IEA, 2011).

4. Fourth, there are various geo-political constraints, tensions and complications – the North-South divide, the growing divisions within the South, and significant distrust between key powers.
5. Fifth, there is the enduring problem of US exceptionalism: the United States is a very unwilling participant in international treaties. Securing Senate approval for a new climate treaty will be extremely difficult, if not impossible. This has major implications for the kind of agreement that might be possible. Chinese exceptionalism may also prove to be an equally difficult hurdle.
6. Sixth, climate scepticism is alive and well, especially in key democracies like Canada and the US. It has been fuelled, at least in part, by those with a large stake in a high-carbon economy. It is no comfort that all the remaining Republican candidates for the US Presidential elections this year reject the need for urgent action on climate change. To quote Rick Santorum: climate change is ‘an absolute travesty of scientific research that was motivated by those who, in my opinion, saw this as an opportunity to create a panic and a crisis for government to be able to step in and even more greatly control your life’.<sup>2</sup>
7. Seventh, the policy issues surrounding a new agreement are highly complex and divisive. Currently, the parties are at loggerheads over many of the critical issues, not least the level of ambition, burden-sharing arrangements, the use of market mechanisms, the overall architecture of commitments and actions, and the legal form of any new agreement.
8. Eighth, as a result of the global financial crisis, economic, rather than environmental, issues dominate the world’s attention. This seems destined to continue for some years. Amongst other things, it means there is less government finance available for mitigation and adaptation initiatives.
9. Ninth, human beings have deeply-rooted behavioural characteristics that militate against effective action to address climate change. This includes a strong dose of self-interest and acquisitiveness, a tendency for selective moral disengagement, a relatively high private discount rate or myopia, the undervaluing of long-term risks, and a cognitive bias in favour of the status quo, attributable in part to loss aversion and the endowment effect (see Bandura, 2007; Thaler and Sunstein, 2009). Theologians blame some of these traits on humanity’s fallen or disordered state. Pope Benedict XVI (2005) put it thus:<sup>3</sup>

... the external deserts in the world are growing, because the internal deserts have become so vast. Therefore the Earth’s treasures no longer serve to build God’s garden for all to live in, but they have been made to serve the powers of exploitation and destruction.

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<sup>2</sup> <http://2012.talkingpointsmemo.com/2012/02/santorum-goes-biblical-with-climate-change-denial.php>

<sup>3</sup> See also Benedict XVI *Caritas in Veritate: Encyclical Letter* (Rome, 2009).

10. Finally, the decision-making processes employed within the UNFCCC are convoluted, cumbersome and unwieldy.

Given these obstacles, what are the prospects of success? Can a new, environmentally effective global climate treaty, based on the Durban Platform, be negotiated over the next four years? And irrespective of the answer, how can we increase the speed of the global convoy to reduce emissions over the longer term?

These questions lie at the heart of this lecture. I will proceed as follows. First, I will offer some brief comments about the science of climate change. I will then outline the current international policy regime for addressing climate change and the outcome of the recent UN conference in Durban, known as COP 17. Following this, I will identify the key obstacles to the negotiation of a new, environmentally effective global climate treaty and how they might be overcome.

Please note that this topic is large and complex. The policy issues are multiple and tortuous. I cannot do the subject justice in the time available. Accordingly, I will be selective. In particular, I will focus almost exclusively on mitigation issues and ignore the equally substantial issues surrounding adaptation and the financing of climate action, including capacity building and technology.

### **Climate science**

Debate continues over many aspects of the science of climate change, not least the issue of climate sensitivity, the speed of warming, and the magnitude of the likely damages. This debate is destined to continue; that is the nature of science – especially science that deals with uncontrolled and complex systems. Clearly, much uncertainty remains. Indeed, the more we discover about climate change, the more we encounter surprising results and new questions. As a lay person, this is an aspect of climate change that I find both fascinating and concerning. But Ross Garnaut (2008, pp.1-2) was surely correct when he said:

The outsider to climate science has no rational choice but to accept that, on the balance of probabilities, the mainstream science is right ... We will delude ourselves if we think that scientific uncertainties are cause for delay. Delaying now will eliminate attractive lower-cost options ... To delay is to deliberately choose to avoid effective steps to reduce the risks of climate change to acceptable levels.

The findings of the mainstream science have been laboriously and painstakingly summarized every five years or so by the Intergovernmental Panel on Climate Change (IPCC). As presented in the Fourth Assessment Report of the IPCC in 2007, they are as follows:

- i. First, there is 'unequivocal' evidence that the planet is warming (IPCC, 2007a, p.5), with the global mean surface temperature having risen by about 0.8°C since pre-industrial times. There is another 0.5°C in the pipeline.
- ii. Second, most of this warming 'is *very likely*<sup>4</sup> due to the observed increase in anthropogenic greenhouse gas concentrations' (ibid., p.10). For instance, CO<sub>2</sub> concentrations have increased from around 280 parts per million (ppm) in pre-industrial times to around 394 ppm currently, a rise of 40%. On a business-as-usual (BAU) scenario, they are destined to exceed 560 ppm well before the end of the century. Even at current levels, CO<sub>2</sub> concentrations are probably higher than they have been for 20 million years; a level of 560 ppm would return the Earth's atmosphere to a state not witnessed for possibly 40 million years (Barrett, 2006).
- iii. Third, further warming is highly likely – indeed, if greenhouse gas emissions continue around current rates, warming and related climatic changes during the 21<sup>st</sup> century are very likely to exceed those during the 20<sup>th</sup> century (IPCC, 2007a, p.13).
- iv. Fourth, because of the long-lags in the climate system and the fact that the removal of CO<sub>2</sub> from the atmosphere is extremely slow, global temperatures and sea levels will continue to rise 'for more than a millennium' (ibid., p.17).
- v. And fifth, as the planet warms, there will be increasingly significant changes in local and regional climates, together with a high probability of negative impacts of ever greater scale, severity and duration. The costs associated with these impacts are likely to increase in a non-linear manner.

In evaluating the likely long-term impacts of climate change, the IPCC (2001) has identified five main 'reasons for concern' (RFCs). These are, in brief:

- i. first, risks to unique and threatened systems (e.g. the loss of unique ecosystems, endangered species, and island nations);
- ii. second, risks of extreme weather events (e.g. more extreme storms, floods, droughts and heat waves);
- iii. third, concerns about the distribution of impacts and vulnerabilities (e.g. different populations, regions and nations will be affected in different ways, with the least advantaged exposed to the greatest risks);

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<sup>4</sup> In the language of the IPCC, 'very likely' means at least a 90% chance.

- iv. fourth, concerns about the aggregate impacts (e.g. the overall magnitude and range of impacts will increase as the climate system warms); and
- v. fifth, risks of large-scale singularities or discontinuities (e.g. as global temperatures rise there is an increasing risk that certain ‘tipping points’<sup>5</sup> will be crossed resulting in abrupt and irreversible impacts).

In order to avoid these outcomes, the concentration of greenhouse gases in the atmosphere needs to be stabilized. To do this will require a substantial reduction in greenhouse gas emissions. This, in turn, requires major changes in technology, energy prices and human behaviour. In short, humanity needs to stop burning fossil fuels, except in the context of carbon capture and storage, and limit deforestation.

This scenario poses at least three fundamental questions, all with significant moral and political overtones. First, what should the long-term goal be? That is, what should be the stabilization target or the maximum allowable aggregate emissions and on what basis should it be set? Second, how should the costs of achieving this long-term goal be shared globally and overtime? In other words, what principles should govern the process of burden-sharing and how should these principles be weighted and applied? Third, what kind of global policy architecture is required? That is, what are the appropriate policy tools and instruments, and related transparency mechanisms – involving measurement, reporting and verification? Keep those three issues – the long-term goal, burden sharing and policy instruments – in mind as I work through the relevant territory.

### **The International Climate Policy Regime**

We already have a global treaty designed to help us address these issues: it is called the United Nations Framework Convention on Climate Change (UNFCCC). This was negotiated twenty years ago in 1992 and came into force in 1994. Virtually every country on the planet has ratified that Convention, including the United States. The key objective of the UNFCCC is to stabilize greenhouse gas concentrations

at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.

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<sup>5</sup> According to Hansen et al (2008, p.10) ‘tipping points’ refer to the notion that the climate system ‘can reach a point where, without additional forcing, rapid changes proceed practically out of control’. At some juncture the system moves beyond a ‘point of no return’, where certain consequences are inevitable, even if climate forcings are reduced. This entails irreversibility, at least within non-geological timeframes.

Given that the Convention is an international treaty with near universal membership, the concept of 'dangerous anthropogenic interference' carries considerable moral, political, and legal authority. But the Convention does not define 'dangerous anthropogenic interference', and its meaning and policy implications remain contentious (e.g. see Hansen, 2004; Jaeger and Jaeger, 2010; Mann, 2009; Pachauri, 2006; Schneider, 2001; Schneider and Lane, 2006; Smith, et al., 2009). I will return to this matter shortly.

Under the UNFCCC, the international community negotiated the Kyoto Protocol in 1997. If the establishment of the UNFCCC marked phase 1 of the global effort to address climate change, the Kyoto Protocol marked the beginning of phase 2. The Protocol came into effect in 2005 and provides a mechanism for limiting the emissions of *developed* countries. Under the Protocol, developed countries are obliged to take on fixed and binding emissions targets for a basket of six greenhouse gases for specified periods. The first commitment period – CP1 – was for five years, starting in 2008. It concludes in December this year.

The Kyoto Protocol has been much vilified. But it has many strengths. It has been the spur for climate action in many developed countries. More important, it has established the essential elements of an overarching global framework for mitigating climate change in a fair, cost-effective, transparent and thus credible manner. The framework includes agreed procedures for measuring, reporting and verifying the emissions of developed countries – with national greenhouse gas inventories, agreed methodologies, annual reporting, common reporting formats, and regular audits by international expert review teams. Without accounting rules and compliance mechanisms of this kind, any mitigation strategy would lack credibility. Transparency is fundamental. The Protocol also provides a series of 'flexible mechanisms' or market mechanisms designed to ensure that emission reductions are achieved in the most cost-effective manner, thereby keeping abatement costs to a minimum. These instruments include the Clean Development Mechanism (CDM), which allows developed countries to purchase emissions units or credits from developing countries where projects are undertaken which reduce emissions against some agreed benchmark. Additionally, Kyoto established a global cap-and-trade regime, in which each developed country has an agreed target in the form of a multi-year carbon budget. Technically these targets are known as 'quantified emission limitation or reduction objectives' or QELROs. Importantly, these targets are not fixed in a spatial or territorial sense. Countries can thus exceed their targets, but if they do so, they must buy recognized emission units from other sources, including via the CDM. Thus, the national targets under Kyoto are really 'responsibility targets' rather than domestic, economy-wide targets.

For CP1, New Zealand was allocated 61.9 million tonnes of CO<sub>2</sub> equivalent per annum, thus giving us 309.5 million assigned amount units (AAUs) over the five years of the commitment period. The figure of 61.9 million tonnes equated to New Zealand's gross emissions in 1990, which was the base year for the new regime. Although our gross emissions will exceed our allocation during CP2, New Zealand is permitted to include the net removal of emissions from land use changes and forestry. Overall, our net emissions are likely to be well within our responsibility target for CP1.

But notwithstanding its various strengths, the Kyoto Protocol is also deeply flawed. First, it is founded upon a largely arbitrary division between developed and developing countries. Only developed countries are required to make binding commitments to limit their emissions. The obligations on developing countries are essentially voluntary. Moreover, since the mid-1990s the global economy has changed radically. China is now the world's largest single emitter. Its greenhouse gas emissions per capita are close to the global average of around 7 tonnes per annum. On current projections, China will produce around 40% of global emissions by 2030. Many so-called developing countries now have significantly higher per capita incomes than some developed countries. Hence, even if a binary model was appropriate in the early 1990s, it certainly is not now.

Second, partly because of the lack of symmetry between the obligations of developed and developing countries, the United States chose not to ratify the Kyoto Protocol. Naturally, national self-interest also loomed large in this decision. The non-participation of the US has undoubtedly undermined the Protocol's credibility and effectiveness.

Finally, the level of ambition for CP1 was very modest – a mere 5% reduction in developed-world emissions during 2008-12 relative to 1990 levels. Global emissions, meanwhile, have continued to rise. Indeed, prior to the global financial crisis they were rising more rapidly than during the period immediately before the negotiation of Kyoto.

For such reasons, a global mitigation architecture built solely on the principles underpinning the Kyoto Protocol has no future. It cannot ensure broad participation. It cannot, therefore, be environmentally effective or cost-effective. A new approach is needed.

### **The Durban Platform for Enhanced Action**

In Durban last December, the global community made progress towards such a new approach. It was only a beginning, but it is potentially of historic significance. We are now in a transition period – moving from phase two of the international effort to address climate change to phase three. Exactly what shape

phase three will take remains unclear, but the journey has begun. The convoy is coming together, but it has yet to chart its course and gather speed.

What, then, did Durban achieve? At least four positive outcomes deserve mention.

1. First, it kept a modified Kyoto Protocol on life support, hopefully until a new climate treaty is crafted. There will be a second commitment period (CP2). This was crucial for keeping developing countries as part of the convoy and a potentially useful signal for international carbon markets (see UNFCCC, 2011b).
2. Second, Durban secured agreement on most of the rules that will apply over the second commitment period. This includes the crucial accounting rules, such as those governing land use, land use change and forestry.
3. Third, Durban launched the Green Climate Fund (GCF). This is intended to be the main long-term financing instrument for climate action in the developing world for both mitigation and adaptation. The objective is to raise \$100 billion per annum by 2020. But it is not clear yet where this funding will come from and donor country commitments remain ambiguous. Only the governance structure of the Fund has been agreed.
4. Fourth, as noted earlier, Durban secured agreement to launch negotiations during 2012 for a new treaty for the post-2020 period. This treaty will apply with 'equal legal force' to all parties, both developed and developing (see UNFCCC, 2011a). A new negotiating track – the Ad Hoc Working Group on the Durban Platform for Enhanced Action – commences work later this year with the aim of reaching agreement by the end of 2015.

This agreement to broaden participation in the global mitigation effort and embrace legal parity is significant – both for the *domestic* politics of climate change and for the *dynamics* of the *international* climate negotiations. First, the agreement to establish a single, unified, legally-binding regime 'applicable to all Parties' removes an important obstacle to progress and an on-going excuse for limited action by certain countries (The Climate Institute, 2011, p.4). Second, it will hopefully bring to an end the current complicated two-track negotiating regime (involving the Ad Hoc Working Group on the Kyoto Protocol and the Ad Hoc Working Group on Long-Term Cooperative Action) and replace it with a single negotiating track.

But while the Durban conference made progress, there are many unresolved issues. These fall into two categories: those needing to be resolved relatively soon for 2013-2020, and those relating to the post-2020 period.

## ***Immediate Issues***

In the short term, the precise shape and duration of CP2 under the Kyoto Protocol has still to be determined. While the commitment period begins on 1 January 2013, there is no agreement yet on whether it will last for five years or eight years. Further, while pledges for emissions reductions by 2020 have been tabled by most developed countries, these need to be translated into multi-year carbon budgets or quantified emission limitation and reduction targets. This is no simple matter. There are some big devils in the detail. For instance, will the starting point for these targets be current annual gross emissions, the annual targets agreed for CP1 or some other formulae?

Nor is it clear which developed countries will ultimately agree to take on binding targets under the Protocol. The 27 countries of the European Union and Norway have said they will. Canada, Japan and Russia have said they will not, although Japan has indicated that any target it takes on under the Convention will comply with the features and rules of the Protocol. New Zealand and Australia, for instance, have yet to decide what to do. Additionally, there remain questions over whether the surplus assigned amount units (AAUs) from CP1 will be available for use during CP2 and, if so, under what conditions. Finally, amendments to the Protocol to give effect to the second commitment period have yet to be tabled and ratified. This process will take several years.

At the same time, the Durban conference made good progress on the 'actions' to be taken by the developing world over the period of CP2 (see UNFCCC, 2011c). These measures are referred to as nationally appropriate mitigation actions (or NAMAs). Such 'pledge and review' actions include renewable energy targets, emissions-intensity targets, emissions-reduction targets relative to business-as-usual baselines, limits on deforestation, and target dates for the peaking of national emissions. It was agreed at Durban that developing countries would establish a 'registry' of mitigation actions, thereby clarifying what pledges are on the table and enabling financial assistance from the developed world for specified actions. It was also agreed that a new biennial reporting regime would be instituted so that progress on emissions reductions can be monitored. The regime will be mandatory for developed countries and major emitters in the developing world. Additionally, progress will be monitored in the developed world by a process known as international analysis and review, and in the developing world by a process known as international consultation and analysis.

Against this, there was no agreement on new common accounting rules to measure a country's progress towards meeting its target. These are crucial for transparency and credibility. But the success in negotiating the rules within the Kyoto track is a good omen for the Convention track.

Nevertheless, there remains a large gap between the urgent messages of leading climate scientists and the proposed level of emissions reductions. Thus, there was no agreement in Durban on a year for the peaking of global emissions or a global emissions-reduction target for 2050. Crucially, too, the current negotiations are not operating in the context where a fixed global carbon budget over a specified period is agreed and then allocated between countries in accordance with an agreed formula based, amongst other things, on principles of distributive justice. Such a top-down regime is a long way off. It requires a level of international cooperation and consensus, not to mention political leadership, currently beyond our reach.

Instead, we are operating in a bottom-up world of 'pledge and review' or 'pledge and translate'. Countries are putting various kinds of mitigation pledges on the table; some are unconditional, but many are conditional. While these pledges take global goals into account, they primarily reflect the calculus of political leaders regarding what is feasible *domestically*; they are not based primarily on what is required to retain a hospitable climate on this planet. Unsurprisingly, countries are unwilling to commit more than they can deliver. Unsurprisingly, too, such a bottom-up process is generating an aggregate outcome – in terms of global emissions during 2013-2017 or 2013-2020 – that falls far short of the goal of limiting global mean surface temperatures to 2°C above pre-industrial level. The 2°C warming cap was agreed in Copenhagen in December 2009 and reaffirmed in Cancun a year later. Instead, we are on track for a temperature increase of at least 3°C (UNEP, 2010). Somehow, we need to lift the level of ambition and increase the speed of the convoy.

To be more explicit, on a business-as-usual scenario, global GHG emissions (CO<sub>2</sub>e) are expected to be around 56 gigatonnes in 2020. According to an authoritative study commissioned by the United Nations Environment Programme (UNEP, 2010), if all the pledges currently on the table are faithfully implemented (including the conditional ones), if the rules for CP2 are sufficient tight, and if most of the available loopholes are plugged or unexploited, global emissions will be reduced by about 7 gigatonnes to 49 gigatonnes by 2020. But this is about 5 gigatonnes short of what is likely to be required to keep within the 2°C warming cap. And in all likelihood global emissions will not be reduced to 49 gigatonnes, thereby making the task all the harder after 2020 (see Sustainability Council of New Zealand, 2010).

This is where the quest for a new climate treaty post-2020 is highly relevant. If a new treaty can be forged, it has the potential to speed up the global emissions-reduction effort.

## The Longer-term Issues: Towards a New Climate Treaty

Let me start with the *ideal* long-term climate treaty – ideal, that is, in terms of environmental effectiveness, fairness, cost-effectiveness and credibility. Such a treaty would be essentially top-down in nature and have at least six key elements:

1. It would apply to every country and thus have universal coverage.
2. It would have explicit, quantified long-term goals, including a fixed global carbon (or emissions) budget over many decades – for instance from 2020 to 2050, if not beyond. This aggregate cap would be divided into multi-year chunks of decreasing size.
3. It would have an allocation mechanism or burden-sharing arrangement with an explicit formula. Initially, all developed countries and major emitters in the developing world would be allocated a fixed portion of the aggregate carbon budget, using responsibility targets as under Kyoto. Subsequently, over time all countries, other than the very least developed and micro states, would be required to take on responsibility targets.
4. Each country would be able to trade their allocation of emissions.
5. There would be common accounting rules and agreed monitoring, reporting and verification requirements.
6. The global emissions budget and burden-sharing arrangements would be reviewed periodically, and adjusted to reflect the evolving scientific evidence and other relevant considerations.

Conceptually, such an approach would bring together elements of the British Climate Change Act with a legally binding emissions-reduction target for 2050 and graduated five-year carbon budgets, and a burden-sharing formula like that used amongst the 27 countries of the European Union (or what the Europeans call 'effort sharing').

But while conceptually appealing, securing international agreement for such an arrangement would be very difficult, if not impossible, in the current environment. Fundamentally, there are four problems:

1. how to agree on explicit long-term goals and a related carbon budget;
2. how to agree on the allocation of this budget;
3. what policy tools to implement; and
4. how to get key countries to participate and comply.

Let me comment briefly on each of these matters.

### ***The long-term goal***

As noted, recent UN conferences have agreed that the long-term goal should be to keep the global mean surface temperature to 'below' 2°C above pre-industrial levels. A central justification for this target is the assessment of many scientists that beyond 2°C the severity and duration of the impacts of climate change will escalate rapidly; the systemic risks will also rise significantly (Jaeger and Jaeger, 2011). Nevertheless, a substantial minority of countries and many leading scientists argue that lower stabilization targets are essential if the risks of abrupt, large-scale and irreversible changes are to be minimized – along with the related harmful ecological, economic, social and political impacts. For instance, the Alliance of Small Island States (AOSIS), which represents about 40 countries, advocates a limit of 1.5°C (above pre-industrial levels). Likewise, some leading climate scientists, including Dr James Hansen (2009), have recommended a stabilization target of 350 ppm CO<sub>2</sub> and ideally lower. This would most likely translate into a temperature increase of over 1.0°C but less than 2.0°C.

A lower target would undoubtedly be preferable. Consider, for example, the issue of sea-level rise. A sustained temperature increase of little more than 2.0°C could raise the sea level by 15-25 metres over the long-run. Even a sustained increase of 1.0°C will eventually generate an increase of several metres or more (Hansen and Sato, 2011; Rohling, et al., 2009; Schellnhuber, 2009).<sup>6</sup> Recent estimates indicate that even a one metre rise in the sea level would displace millions of people, cause extensive property damage and expose 500 million additional people to flooding (Vellinga, 2009). A rise of two metres would displace nearly 200 million people (New, et al., 2011, p.12), eliminate whole nations and do immense damage to coastal property, infrastructure and ecosystems all over the world, while a 10 metre increase would displace as many as 1 billion people (Nicholls, 2009). Given the extensive harm associated with even a one or two metre rise, it is hard to see how such an outcome could be ethically justified. And of course a temperature increase sufficient to generate a rise in the sea level of this magnitude would cause numerous other harmful consequences.

But keeping global warming significantly below 2.0°C will entail higher immediate economic costs (see Appendix 1) and may not even be technically feasible (certainly without an early peaking of global emissions). But there is a further problem. Even keeping to a 2.0°C warming cap requires agreement on an aggregate limit to global emissions and the translation of this into specific targets for global emissions reductions by specific dates. Thus far, the global community has been unable to take this step, and it is questionable whether a breakthrough will be possible by 2015. Significantly, China blocked progress in Copenhagen in 2009, not least because the transparency of such emissions-

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<sup>6</sup> Admittedly, this process would take millennia, but once the major ice-sheets began to disintegrate, the process would be, in effect, irreversible (except over very long timescales).

reduction targets and carbon budgets would highlight their inconsistency with China's current development path. China was also concerned about the failure of developed countries to accept their contribution to the problem and take more active steps to reduce their emissions.

### ***Burden sharing and the problem of fairness***

But even if agreement could be reached in a new climate treaty on global emissions-reduction targets and the related carbon budgets, the next problem would be deciding a fair allocation of such budgets between countries. This requires an explicit burden-sharing formula.

Under Article 3.1 of the UNFCCC, the Parties are required to 'protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities'. More recently, the notion of 'comparability of effort' has taken centre stage. But all these phrases – 'equity', 'common but differentiated responsibilities', 'respective capabilities', and 'comparability of effort' – are open to differing interpretations depending on which principles of distributive justice are embraced and how they are weighted (see Boston and Kengmana, 2007; UNFCCC, 2011d). It could be argued that countries' responsibilities should be differentiated on the basis of one or more of the following principles:

1. First, there is the *polluter-pays* principle. Under this, a country's emissions-reductions target should reflect their historic responsibility or contribution to the climate change problem as measured by total emissions over time.
2. Second, there is the *ability of pay or capability* principle: Under this, a country's emissions-reductions target should reflect its relative affluence, as measured by GDP per capita.
3. Third, there is the *egalitarian or equal share* principle. Under this, all people should have an equal right to emit the same amount (or a right to an equal amount of atmospheric space), and emissions-reductions targets should move countries towards this goal as quickly as possible.
4. Fourth, there is the *equal marginal cost* principle. Under this, emissions-reductions targets should be configured so that all countries, irrespective of their respective capabilities, face the same marginal cost for each unit of emissions they cut.

5. Aside from these principles, other considerations may be relevant such as mitigation potential (including access to renewable energy sources), early action, population growth, contributions to climate finance, geography and climate (e.g. having a very hot or a very cold climate).

Which of these principles and considerations are embraced, how they are weighted and what reference date is selected all have profound implications for the sharing of the mitigation burden across countries. Not surprisingly, countries tend to favour those principles which are congruent with their national interests. Developing countries emphasize the principle of historical responsibility or polluter pays; developed countries emphasize other principles. I suspect that any attempt to achieve a consensus on which principles are most relevant and how they should be weighted is bound to fail. The best we can hope for is rough justice. But this can also be a problem: any agreement that is plainly unfair in the eyes of many will lack legitimacy and credibility, and thus run the risk of unravelling – with key countries refusing to ratify the treaty, as happened with Kyoto.

### ***Policy Instruments***

As previously argued, a new treaty needs to move beyond the architecture of the Kyoto Protocol while also retaining key elements of the Protocol, including the multi-year carbon budgets, market mechanisms and accounting rules. The issues here are less problematic than with respect to setting long-term goals and sharing the mitigation burden.

In my view, the basis of any new treaty, if it is to be effective, must be multi-year carbon budgets or responsibility targets. In the immediate post-2020 period, these will need to apply to all developed countries and all the major emitters within the developing world, including China and India. China has recently indicated a willingness to consider such an option if certain conditions are met (Sterk, et al., 2011, p.34), but India has not. Eventually, all countries other than the least developed will need to participate in such a regime, such that a very high percentage of world emissions are covered within a global cap. The process of getting there will need to be iterative. In the meantime, developing countries that are not bound by responsibility targets will need to commit to other verifiable emission-limitation measures, such as emissions-intensity targets and renewable energy targets.

### ***Legal form: how to ensure symmetry and broad participation?***

Finally, with respect to the legal form of a new treaty and securing broad participation: Under the Durban Platform, the Parties have agreed to negotiate 'a protocol, another legal instrument or an agreed outcome with legal force'. Exactly what this means has already been the subject of much

debate. But two matters are clear. First, 'an agreed outcome with legal force' does not necessarily imply that every specified climate-related action or commitment of every Party must be legally binding internationally. Some scope for differentiation remains, both in terms of substance and legal bindingness. But second, for political reasons, legal parity or equivalence amongst all the *major emitters* will be essential. It will not be possible for the key obligations of some major emitters to be voluntary, whilst others are bound legally.

But how, then, is the US to be accommodated within such a framework? Without the full and active participation of the US, any new arrangement will lack credibility. And without the US as part of the convoy, most other major emitters will be reluctant participants and/or scale back their commitments. Yet the US is unlikely to ratify a legally-binding, multilateral treaty. Hence, any new international agreement will need to be structured so that domestic mitigation measures undertaken by the US can be properly recognised. At the same time, such measures will need to be sufficiently stringent and sufficiently binding domestically such that there is broad 'equivalency', 'symmetry' and 'comparability' with the internationally-binding commitments of other Parties, whether developed or developing. Otherwise, serious issues of fairness and political acceptability will arise.

In effect, therefore, no new climate treaty is possible until the US is able to commit to domestic measures to reduce emissions substantially during the period after 2020 (e.g. 40% emissions reductions by 2030 on 2005 levels and 80% by 2050), probably via some kind of economy-wide cap-and-trade regime, clean energy standards and a raft of complementary measures. This will require a significant and durable shift in domestic US politics on climate change, especially at the federal level. Realistically, such a shift is unlikely by the end of 2015. Accordingly, it is hard to see how a new treaty can be negotiated by the deadline agreed in Durban. Some delay seems almost inevitable. And even if a new global deal can be struck for the period after CP2, the prospects of it meeting the requirements of a 2.0°C warming cap are slim.

Unfortunately, this means we appear destined to overshoot the 2.0°C target later this century. According to Meinshausen (2006), the damage this will cause will depend on the magnitude of the overshoot, the length of time near the peak, and the extent to which the natural rate of carbon absorption is weakened under the impact of higher temperatures and related feedbacks. In my view, we should not be taking such risks.

## **The Way Ahead: Making Progress**

Standing back from the particulars, the outcome of the forthcoming international negotiations for a new climate treaty will be driven by national politics, and especially by the domestic politics in a number of crucial states. As Wolfgang Sterk et al. (2011, p.34) have put it:

No government is going to let itself be compelled by an international treaty to cut emissions faster than it wants to. International agreements are to a large extent reflections of national will, and cannot be used to force countries to do things that they are fundamentally opposed to.

They go on to point out that:

Most governments are simply not willing to challenge vested interests whose business models rely on using fossil fuels. This will only change if a critical mass of voters and 'green' businesses becomes vocal enough to constitute a counterweight to the incumbent industries (2011, p.35).

How are we to achieve these kinds of shifts in domestic politics? And how are we to increase the speed of the global climate policy convoy?

As Sterk et al. (2011) argue, we need climate change pioneers, leadership and bottom-up initiatives at multiple levels (see also, Netherlands Environment Assessment Agency, 2011). Nationally, we need a number of pioneering countries to steam ahead of the convoy and demonstrate that emissions can be reduced significantly without large negative economic effects, thereby catalysing change elsewhere. Likewise, we need new partnerships amongst groups of pioneering countries to foster research in low-carbon technologies and experiment with new policy instruments to reduce emissions. We need to extend the range of countries that are pricing carbon inputs, thereby increasing the share of global emissions covered by effective pricing measures (whether taxes or emissions trading schemes). And we need to ensure that domestic policy instruments are broadly compatible and, where appropriate, are able to be linked.

Similarly, we need reduce the current subsidies to the fossil fuel industry. These are currently estimated to be in the region of US\$400 billion per annum, about six times the current subsidies for renewable energy sources (IEA, 2011).

We also need active leadership at the sub-national level, within cities and provinces, and across the business sector and civil society, including universities, churches and other faith-based organizations. And, of course, we need to mobilize and galvanize world opinion and encourage strong grassroots action, including both practical local initiatives to reduce emissions and vigorous

political lobbying. This requires lots of time, energy, dedication, commitment and hard work. But only through such means will it be possible to build the impetus domestically that is necessary for countries to take on more ambitious and binding commitments internationally. And only through such commitments will it be possible to negotiate a new treaty, bring pressure to bear on the laggards, and quicken the overall pace of the global convoy. And without a quicker pace, future generations will face an ever more inhospitable climate.

New Zealand has clear responsibilities in this context. We may be a small player internationally, but we are not without influence or expertise. Equally, because we are small we have the capacity to act more swiftly than many others – but only if there is the necessary political will. Currently, this is in short supply. Specifically, I believe New Zealand should do the following: first, we should join the European Union in taking on a responsibility target under Kyoto (rather than the Convention) for CP2. This target should entail a 20% reduction in emissions by 2020, with the CP1 target (i.e. 1990 levels) as the starting point or reference level. Second, we should move to incorporate the agricultural sector into the emissions trading scheme, and amend this scheme over time so that it more environmental effective. Specifically, it needs an aggregate cap. Third, we should continue to invest significantly in research and development, especially with respect to agricultural emissions. Finally, we should actively pursue a range of complementary measures designed to reduce emissions.

## **Conclusion**

To sum up, human-induced climate change represents one of the great moral and political challenges of our times; it is a defining issue. It is also a super-wicked issue, where the prospects of success remain limited and where hopes are easily dashed. But the scale of the challenge provides no excuse for withdrawal, despair or defeatism. We may, as philosopher Stephen Gardiner (2011) has put it, be entering 'a perfect moral storm', but there is no ethical shelter in denial or disengagement. We each have a moral responsibility to act and to act decisively.

The Durban conference highlights that international progress to address climate change is possible. A new climate treaty may be years away, but it is not utterly beyond our grasp. There is much work to be done, not merely in the negotiating halls of the UNFCCC but also at the domestic level right across the globe, including here in New Zealand.

Let me close with two final thoughts. First, on a positive note: although global emissions continue to rise, the decarbonisation of the global economy is underway and gathering pace. In 2010, for instance, the global investment in renewable energy sources outpaced investments in fossil fuels – for the first time ever. Likewise, the cost of many forms of renewable energy continues to fall as capacity expands and technologies improve. On current trends, for instance, the cost of solar PV could fall below that of coal before 2020 (Sterk, et al., 2011, p.35). Such trends are a clear sign of hope.

Second, we are all in this together; we are all part of the convoy; our destinies are intertwined; and we all have a responsibility to act. More than two decades ago, in 1989, at the United Nations, the former British Prime Minister, Margaret Thatcher, gave a speech on the global environment. On climate change, she had the following to say:

Mr President, the evidence is there. The damage is being done. ... We need a realistic programme of action and an equally realistic timetable. Each country has to contribute, and those countries who are industrialised must contribute more to help those who are not. The work ahead will be long and exacting. We should embark on it hopeful of success, not fearful of failure. ... We are not the lords, we are the Lord's creatures, the trustees of this planet, charged today with preserving life itself—preserving life with all its mystery and all its wonder. May we all be equal to that task.

## Appendix 1: A Note on Climate Stabilization

Climate stabilization targets can be expressed in at least three different ways: first, one can specify the maximum level (or flow) of greenhouse emissions (e.g. in cumulative terms over a particular period of time); second, one can specify the maximum concentration (or stocks) of greenhouse gases in the atmosphere, whether expressed in terms of CO<sub>2</sub> or alternatively in terms of CO<sub>2</sub>e; and third, one can specify a maximum permitted increase in the global mean surface temperature. The three kinds of targets are all important and are closely related: flows influence stocks, and stocks influence temperatures. But the relationships between these elements are not fixed.

There are arguments for and against each kind of target. Many prefer temperature targets because they are easy to understand and are thus politically convenient. Also, temperature increases are relevant for considering impacts, including how extensive, severe and persistent these impacts might be. But as Lord Stern (2008, p.2) correctly observes, focusing on temperature maxima runs the risk of concealing 'crucial elements that matter greatly to social and economic outcomes'. This includes the effects of warming on regional climates, as well as storms, floods, and droughts. Moreover, temperatures cannot be targeted directly; they must be targeted via concentrations, which in turn are dictated by (cumulative) emissions and the carbon cycle. For such reasons, many scientists, policy makers and activists focus on stocks – or concentrations – rather than temperature maxima. Hence, the Stern Review on the Economics of Climate Change (2007) recommended a maximum concentration target of 550 ppm CO<sub>2</sub> equivalent. He has more recently argued for a lower target of 450 ppm.

Against this, other scientists maintain that the focus of attention should be the aggregate quantum of emissions, especially of carbon dioxide, that can be emitted if we are to have a reasonable chance of remaining within a specified temperature cap. Under this approach, a global carbon budget can be calculated for any given temperature maxima, albeit within certain parameters of probability. This budget can then be allocated, both over time and between nations. Conceptually, this has many attractions but politically it is highly problematic.

Whatever the precise form and level of the target, a critical issue is the timeframe for the peaking of global emissions and hence the speed and magnitude of emission reductions. For any given target, the later the peak the more rapidly they will need to fall following the peak. And reducing emissions rapidly is likely to be harder than reducing them more slowly, not least because most large energy generating systems have a long life-span. Hence, the longer we delay curbing global emissions, the greater the challenges we will face – technically, economically and politically. Beyond a certain point in time, it will be impossible to remain within a fixed global emissions cap or a carbon budget. Currently, we are using up the available atmospheric space at a rapid rate, leaving less and less for our children, let alone

future generations. In terms of intergenerational equity, this is surely unjust. But there is also a serious issue of intra-generational equity. Much of the available atmospheric space has already been used up by those living in the developed world. The wealthy have left precious little space for the poor, certainly on a per-capita basis. It is hard to reconcile this with any of the well-established principles of justice.

The global economic costs of climate stabilization targets need consideration. Very ambitious targets will almost certainly cost more than less ambitious ones, at least in the short-to-medium term.<sup>7</sup> For instance, the Stern Review calculated that a target of 500 to 550 ppm CO<sub>2</sub> equivalent would result in global GDP in 2050 being around 1% than would have been the case in the absence of a mitigation strategy (with a range of -5% to plus 1%).<sup>8</sup> By contrast, a lower target of 450 ppm would cost around three times as much (Stern, 2007, p.276), or up to around 5.5 per cent of GDP by 2050 (IPCC, 2007d). Since most people are likely to be significantly better off in 2050 than currently (with average per capita GDP more than doubling), the loss of even 5% of global GDP would constitute a relatively modest overall cost. Other recent assessments of the costs of decarbonising the global economy are broadly consistent with those of Stern.<sup>9</sup>

Further, the short-term costs of ambitious targets need to be compared with the likely long-term costs and risks of doing very little. Irreversible impacts, after all, go on and on. Moreover, there is the potential for a large-scale and relatively rapid decarbonizing strategy to generate considerable economic benefits over the longer-term, just as the ICT revolution has done over recent decades. The problem is the short-term hump of starting along this road, together with the uneven distributional impacts of decarbonization. This is where the politics of climate change policy are daunting.

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<sup>7</sup> More ambitious targets cost more because of the need to retire carbon-intensive capital stock prematurely, retrofit cleaner technologies (which tend to be more expensive than starting from scratch), adopt more costly low-carbon technologies, and accelerate the uptake of carbon capture and storage. Against this, there are also likely to be additional benefits from rapid decarbonisation including lower pollution levels, better health outcomes, enhanced flood protection, more sustainable land management practices, improved water quality, greater energy efficiency, new technological breakthroughs, and an improved quality of life.

<sup>8</sup> These estimates assume the adoption of efficient and effective policies, including a global carbon price. Without such policies the real costs of emission reductions are likely to be much higher.

<sup>9</sup> See Hatfield-Dodds (2006, p.221); IPCC (2007c); Metz and D van Vuuren (2006, p.337).

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