

The climate change regime

Alexander Zahar

After more than twenty years of development, the international climate change regime has grown into a vast agglomeration of transnational regulation and practice. In the chapter we consider its most salient features: the UN's Framework Convention and Kyoto Protocol and the main institutions that have been created under them. We also ask whether the regime is on track to meet its aim of saving the world from dangerous climate change.

Introduction: a 'global-global' problem

In our response to climate change there has been an expectation that the world's wealthy countries will move in lockstep to solve it. Even developing countries are expected to march in unison, albeit at some distance behind wealthier states. This is unprecedented. Older environmental harms, such as water pollution, deforestation, species' loss or overfishing, are 'global' in the narrow sense that they occur wherever large concentrations of people live. The traditional global-local kind of problem can be solved as other local problems are solved, that is, without being concerned about whether the same type of problem is being tackled simultaneously (or instead ignored) in other parts of the world or even in other parts of the same country.

Anthropogenic climate change is in a class of its own because it is an indivisible problem with global causes and effects. Its causes are everywhere. Each person contributes to increasing the concentration of greenhouse gases in the atmosphere simply by being alive (exhaling carbon dioxide, or CO₂), utilising traditional sources of energy, relying on agricultural products, and so on. Emissions from human activity become part of an atmospheric pool and have global climatic consequences. One ton of CO₂ emitted in Angola has the same physical effect as one ton emitted in Australia – it joins an indistinguishable atmospheric whole. These globally dispersed human contributions to the greenhouse effect unite to produce the singular phenomenon of climate change, manifested at a basic physical level through global mean temperature rise and ocean acidification. In turn, these changes produce physical effects everywhere in the world.¹

- 1 The only other problem of this kind – tiny by comparison – is the damage to the ozone layer caused by anthropogenic ozone-depleting substances. Ozone-depleting substances consist of a few artificial chemicals produced at well-known locations in a small number of countries. Alternatives to them are readily available.

Table 20.1 Important dates in the global response to climate change

1988: Intergovernmental Panel on Climate Change (IPCC) jointly established by World Meteorological Organization and UN Environment Programme
1990: IPCC First Assessment Report
1992: UNFCCC adopted (9 May)
1994: UNFCCC enters into force (21 March)
1997: Kyoto Protocol adopted (11 December)
2001: Bush Administration withdraws United States from the Kyoto Protocol (March)
2005: Kyoto Protocol enters into force (16 February)
European Union Emissions Trading Scheme (EU ETS) goes into operation
2007: IPCC Fourth Assessment Report.
UNFCCC adoption of Bali Road Map aimed at reaching a new global comprehensive agreement on climate change mitigation by 2009
2008: Start of Kyoto Protocol's first commitment period (2008 to 2012)
2009: Copenhagen Accord, instituting non-binding emission-reduction pledges for the post-2012 period, patched together in closing hours of UNFCCC conference
2011: UNFCCC conference, Durban: European Union and a few other countries agree to a second commitment period under the Kyoto Protocol (2013 to 2017 or 2020; end-date remains to be decided); Canada withdraws from Kyoto Protocol

The logic of the climate change problem has strongly determined the shape of the climate change regime. It helps us understand the regime's achievements as well as its failures. Some of the milestones of that regime are presented in Table 20.1. The purpose of this chapter is to discuss the key elements of the two main pillars of the international climate regime – the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. What obligations do these two treaties impose on states? How well have states been complying with their obligations? And what difference has it made for climate change?

State obligations under the Framework Convention

The UNFCCC's preamble states that 'there are many uncertainties in predictions of climate change, particularly with regard to the timing, magnitude and regional patterns thereof'. This was taken almost word for word from the IPCC's first assessment report, dating from 1990.² Those were the early days of climate science, when the uncertainties were indeed high compared with the state of our knowledge twenty years later. The IPCC in 1990 expressed 'certainty' on only two points about the physical science of climate change: certainty that a natural greenhouse effect keeps the earth warmer than it would otherwise be; and certainty that emissions resulting from human activity are substantially increasing the atmospheric concentration of CO₂ and other greenhouse gases (GHGs), with the result that the

² Intergovernmental Panel on Climate Change, *First Assessment Report, Vol. 1: Overview and Policymaker Summaries* (World Meteorological Organization, 1990), p. 53.

greenhouse effect could be expected to be enhanced.³ There was no certainty at that time that the climate had recently warmed or that the warming effect had been caused by human activity. By 2007, though, when the IPCC's fourth assessment report was released, the IPCC could state 'unequivocally' that the climate is warming; it could state with 'very high confidence' that the warming is caused by anthropogenic emissions;⁴ and it could state, also with very high confidence, that the warming is strongly affecting terrestrial biological systems.⁵

The Convention's preamble continues with the acknowledgment that 'the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions.' Reading between the lines, the truly global nature of the climate problem, whose logic we reviewed above, has the effect of retarding mitigation action by willing countries when other countries, which have substantial GHG emissions, favour a business-as-usual approach. When conjoined with a climate-warming problem portrayed as urgent, this logic determines the kind of treaty that comes into being first: an agreement to be signed by *all* states. This agreement necessarily is little more than an unobjectionable shell – a mere *process* for agreeing to concrete actions at a later date. Hence the UNFCCC preamble's emphasis on 'the widest possible cooperation', as opposed to, say, the deepest possible cuts in GHG emissions.

This section focuses on the UNFCCC's substantive part (Articles 2 to 4). To appreciate the state of today's climate change regime it is important to understand this part. The Convention's *objective* is:

stabilization of greenhouse gas concentrations in the atmosphere 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.

'Stabilization' means the return to a relatively unvarying concentration of CO₂ in the atmosphere (measured in parts per million, or ppm). The concentration of CO₂ in the pre-industrial era (up until the end of the eighteenth century) was relatively unvarying, ranging from 275 to 285 ppm. Following industrialisation, the 10 ppm margin of variation was shattered. In 2005, the CO₂ concentration measured 379 ppm and was rising by about 2 ppm per year.⁶ When the effect of all anthropogenic GHGs in the atmosphere is taken into account, the CO₂-equivalent concentration in 2005 was around 455 ppm.⁷ Greenhouse gases have thus built up so significantly as to have almost doubled their from the pre-industrial-period.

³ Ibid., p. 53.

⁴ Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report* (2007), pp. 30, 37.

⁵ Ibid., p. 33.

⁶ Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the IPCC*, Cambridge: Cambridge University Press, 2007, p. 137.

⁷ Intergovernmental Panel on Climate Change, *Climate Change 2007: Mitigation of Climate Change: Contribution of Working Group III to the Fourth Assessment Report of the IPCC*, Cambridge: Cambridge University Press, 2007), p. 97.

The Convention provides little practical assistance on the concentration we should aim to ‘stabilize’ at. The only guidance in the Convention’s objective is the imperative to prevent ‘dangerous’ interference with the climate system. As the IPCC has observed, defining ‘dangerous’ and the limits to be set for policy purposes ‘are complex tasks that can only be partially based on science, as such definitions inherently involve normative judgments’.⁸ So, while the UNFCCC’s objective does begin to articulate a legal obligation upon states parties (i.e. the obligation to reduce collective emissions), it is an ill-defined obligation.

The UNFCCC’s Article 3 (‘Principles’) may be divided into five principles. It is interesting to reflect on the extent to which they are mutually compatible:

- (i) The parties ‘should protect the climate system for the benefit of *present and future generations* of humankind, on the basis of equity’.
- (ii) They should do so ‘in accordance with their *common but differentiated responsibilities* and respective capabilities. Accordingly, the developed country parties should take the lead in combating climate change’.
- (iii) The parties ‘should take *precautionary measures* to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost’.
- (iv) The parties ‘have a right to, and should, promote sustainable development’; moreover, ‘*economic development is essential* for adopting measures to address climate change’.
- (v) The parties should ‘promote a supportive and *open international economic system*’.

The last of these principles, encouraging open economies, implicitly recognises that global economic openness is far from certain. As the IPCC has put it, ‘By 2100 the world will have changed in ways that are difficult to imagine, as difficult as it was at the end of the nineteenth century to imagine the changes of the twentieth century.’⁹ This remark was made in the context of the IPCC’s development of ‘emission scenarios’, which have come to assume a central place in research-based and scholarly narratives about the future. The IPCC’s four emission scenarios effectively treat as uncertain the extent to which economic globalisation and increased social and cultural interactions will continue over the course of the twenty-first century. Two of the emission scenarios emphasise global economic convergence as well as intensive social and cultural interaction; the other two focus on possible regional developmental pathways that take our societies in a direction of divergence

⁸ Ibid., p. 97. The term ‘dangerous climate change’ is still in common usage today and is now generally associated with a global mean temperature rise greater than 2 degrees Celsius from pre-industrial levels. See e.g. Australian Climate Commission, *The Critical Decade: Climate Science, Risks and Responses*, Australian Climate Commission, 2011, p. 18.

⁹ Intergovernmental Panel on Climate Change, Special Report on Emission Scenarios. Online. Available HTTP: <<http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=91#4.2.1>> (accessed 2 May 2012).

and traditionalism.¹⁰ These different factors are strongly correlated with differences in the intensity of anthropogenic GHG emissions. But the truth is we do not know what kind of future is in store for us.

The UNFCCC’s Article 4, on ‘Commitments’, has a long and complex structure, summarised in Table 20.2. The article is divided into obligations common to all parties, obligations

Table 20.2 Summary of the main state obligations (and rights) in UNFCCC Art. 4

All parties	Annex I parties	Annex II parties (OECD)
→ → → → → → → → → → → → <i>→ increasing burden →</i> → → → → → → → → → → → →		
<ul style="list-style-type: none">• Prepare GHG inventory – but in the case of developing parties only if capacity permits.• Implement, publish, and regularly update national measures to mitigate climate change, as well as measures to facilitate adaptation to climate change, including integrated plans for the management of water resources and agriculture.• Promote sustainable management of GHG sinks/reservoirs including forests and oceans.• Cooperate in scientific research and systematic observation.	<ul style="list-style-type: none">• Have in place national mitigation policies and measures limiting anthropogenic GHG emissions and aimed at returning emissions to 1990 levels by 2000.• Periodic detailed report to UNFCCC on above policies and measures, specifying estimated impact on GHG emissions.• Calculation of reported emissions and removals to be scientifically sound.	<ul style="list-style-type: none">• Provide new and additional finance to meet costs incurred by developing parties in complying with their reporting obligations.• Same as above for transfer of technology, etc., needed by developing parties to meet the implementation costs of the measures in leftmost column.• Assist developing parties that are particularly vulnerable to the adverse effects of climate change to meet adaptation costs.• Take all steps to facilitate and finance other parties’ access to environmentally sound technologies and know-how.
<i>Developing-party rights</i>		
<ul style="list-style-type: none">• A developing country may request technical and financial support in compiling and communicating information required under the Convention.• It may propose mitigation/adaptation projects for financing by Annex II parties, including specific technologies needed, with an estimate of consequent benefits.• The extent to which developing parties implement their commitments will depend on financial resources and transfer of technology from Annex II parties.		

10 L. Bernstein, et al., *Climate Change 2007: Synthesis Report*, Geneva: IPCC, 2007, p. 44. Online. Available HTTP: <http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm> (accessed 2 May 2012).

pertaining only to ‘Annex I parties’ and obligations exclusive to ‘Annex II parties’.¹¹ Consistently with the Convention’s provisions leading up to this point in the treaty text, even the general commitments relating to all parties do not impose equal obligations on all, or demand undifferentiated obedience. They are, instead, subject to the parties’ ‘common but differentiated responsibilities’.¹²

The Convention requires all states to ‘[d]evelop, periodically update, [and] publish . . . national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases . . . using comparable methodologies’.¹³ This is the foundation of a complex and influential web of international regulation. It aims to answer the question: what quantity of GHGs does each state emit per annum? Twenty years ago we had no ready or very accurate answer to that question. We will return to this point below.

The commitment in UNFCCC Article 4 that most directly tackles climate change is made by Annex I parties. They must ‘limit’ their anthropogenic GHG emissions. To limit is not the same as to cut, and a limitation that caps not overall emissions but *the rate of emission growth* is compatible with uninterrupted growth in emissions (albeit at a slower rate).

Having referred somewhat ambiguously to a ‘limit’, the language of Article 4 becomes diluted to such an extent that the limitation commitment is reduced to a mere aim or aspiration:

Policies and measures will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objective of the Convention, recognizing that the *return by the end of the present decade [i.e. by 2000] to earlier levels* of anthropogenic emissions of carbon dioxide and other greenhouse gases . . . would contribute to such modification, and taking into account the differences in these Parties’ starting points and approaches . . . the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances, as well as the need for equitable and appropriate contributions by each of these Parties to the global effort regarding that objective.¹⁴

In the continuation of this Article we learn that the phrase ‘earlier levels’ of emissions means Annex I emissions as they stood in 1990. Thus the quoted paragraph succeeds in carving out a temporal period in which to test the parties’ commitment to ‘modify longer-term trends’ in their emissions: by the year 2000, the Article implies, Annex I parties should have returned collectively to their 1990 emission levels.

In the event, only seven out of twenty-three OECD/Annex II states were able to do so (Table 20.3). The shaded rows highlight the countries that might be said to have complied with the implied commitment in Article 4 of the UNFCCC to return GHG emissions to 1990 levels by 2000. Note that the years 2008 and 2009 are the first two years of the Kyoto Protocol’s first commitment period, discussed in the next section.

11 *Annex I* stands for OECD countries (as the membership stood in 1992) and economies making a transition to a market economy (countries of the former Soviet bloc). Annex II is a subset of Annex I, consisting of OECD countries only.

12 *United Nations Framework Convention on Climate Change*, opened for signature 4 June 1992, 31 ILM 854 (entered into force 21 March 1994) (‘UNFCCC’) Art. 4.

13 UNFCCC, Art. 4(1)(a).

14 UNFCCC, Art. 4(2)(a), emphasis added.

Table 20.3 Greenhouse gas emissions of OECD/Annex II countries (excluding emissions and removals from LULUCF), 1990–2009, in Mt (megatonnes) CO₂ eq. per annum¹⁵

OECD country	1990	2000	2008	2009	2009 change over 1990 (%)
Australia	418.5	496.3	550.9	545.9	30.4
Austria	78.2	80.5	87.0	80.1	2.4
Belgium	143.3	145.4	135.1	124.4	–13.2
Canada	591.3	717.6	733.7	691.8	17.0
Denmark	69.4	69.3	65.2	62.3	–10.2
Finland	70.4	69.2	70.4	66.3	–5.7
France	565.0	571.0	544.3	522.4	–7.7
Germany	1,248.0	1,042.1	981.1	920.0	–26.3
Greece	104.6	126.2	128.7	122.7	17.4
Iceland	3.4	3.8	4.9	4.6	35.1
Ireland	54.8	67.9	67.8	62.4	13.8
Italy	519.2	551.6	541.7	491.1	–5.4
Japan	1,266.6	1,341.8	1,280.6	1,209.2	–4.5
Luxembourg	12.8	9.8	12.2	11.7	–8.9
Netherlands	212.0	213.2	204.6	199.0	–6.1
New Zealand	59.1	68.4	72.8	70.6	19.4
Norway	49.8	53.4	53.7	51.3	3.1
Portugal	59.4	81.3	78.0	74.7	25.6
Spain	283.2	379.6	404.8	367.5	29.8
Sweden	72.5	69.0	63.6	60.1	–17.2
Switzerland	53.1	52.0	53.4	51.9	–2.2
United Kingdom	779.4	673.5	624.1	570.1	–26.9
United States	6,166.8	7,076.3	7,027.9	6,608.2	7.2
Total	12,880.8	13,959.2	13,786.5	12,968.3	0.7

A few of the countries in Table 20.3, including the United Kingdom, could boast a consistent downward trend at least partially attributable to government policy. (In the UK's case there was a major shift from coal to less polluting gas-based power generation in the 1990s.)¹⁶ Three of the seven shaded countries (Finland, Luxembourg, and Switzerland) were unable to maintain their downward trend past 2000, their emissions rising again by 2008 only to fall a year later due to the Global Financial Crisis. Most OECD countries, seem to have paid scant regard to the trajectory urged upon them by Article 4 of the Convention. Australia, Canada, and the United States, among others, decisively increased their emissions in the period from 1990 to 2000, with the first two also reporting higher annual emissions in 2008/2009 compared to 2000.

¹⁵ Adapted from UNFCCC Secretariat, *National Greenhouse Gas Inventory Data for the Period 1990–2009* (16 November 2011), Table 5. 'LULUCF' stands for 'land use, land-use change, and forestry'. The estimation of GHG emissions/removals in the LULUCF sector is relatively uncertain. Moreover, human control over LULUCF emissions/removals is not as complete as in other economic sectors. Hence state GHG emissions are conventionally reported using two sets of numbers, one including the estimated LULUCF contribution and the other excluding it.

¹⁶ UNFCCC Secretariat, *Compilation and Synthesis of Fourth National Communications: Executive Summary*, 2007, p. 3.

For twenty years the UNFCCC has defined the international climate change regime. It will probably retain this role for many years to come. While it lacks the specificity of the Kyoto Protocol in the critical area of emission reductions (see below), its ongoing role as a 'framework' for international cooperation is generally accepted.

State obligations under the Kyoto Protocol

Article 17 of the UNFCCC provides for the addition of protocols. The Kyoto Protocol came into force in 2005. It has been ratified by all parties to the UNFCCC except the United States. (Canada withdrew from the Protocol in 2012.) The Kyoto Protocol's most newsworthy feature is its imposition of quantified GHG emission caps on Annex I parties. This occurs in Article 3(1) of the treaty text:

The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B and in accordance with the provisions of this Article, with a view to reducing their overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012.

This passage has become the most divisive of all provisions of the Kyoto Protocol. The ongoing defence of the Protocol has boiled down to the defence of the idea behind this passage; and the increasingly vocal opposition to the Protocol is simply the rejection of this idea. The idea in question is that those UNFCCC parties that are wealthy and have historically high emissions (developed countries) should accept a legally binding obligation to reduce their emissions over a certain period (in this case 2008 to 2012) by a certain amount ('at least 5 per cent') below a historical benchmark (1990 emissions). All remaining parties (developing countries) are to have no such obligation, but instead generally worded sustainability aims.

The main reason for *opposition* to the idea is that the actual and projected growth in emissions in the unbound group exceeds that of the bound group and renders the effort in the bound group ineffective. The main reason for its *defence* is that without binding emission caps – without compliance mandated by law – each country's emission-control policy will vary unpredictably.

The opposing sides emphasise the 'environmental integrity' of their respective positions. Critics of the Protocol are eager for an alternative because the entrenched negotiating positions have stalled progress.¹⁷ Their critique is difficult to appreciate. For if the Protocol were allowed to evolve over time, incrementally enlarging the group of countries with legally binding emission caps, it could tackle climate change as well as any other arrangement could. Instead, the UNFCCC parties agreed at their conference (COP) in Durban in 2011 to create a new agreement for the post-2020 period outside the framework of the Kyoto Protocol.¹⁸ At this stage it is not known what that agreement might look like.

Article 3 of the Protocol outlines a procedure for the creation of commitment periods additional to the first.¹⁹ The Article provides that party negotiations on a subsequent

¹⁷ See, e.g., E. Diringer, 'Letting Go of Kyoto', *Nature* 479, 2011, p. 292.

¹⁸ UNFCCC, *Decision 2/CP.17, Outcome of the Work of the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention*, 2011.

¹⁹ *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, opened for signature 11 December 1997, 2303 UNTS 148 (entered into force 16 February 2005) ('Kyoto Protocol'), Art. 3(9).

commitment period are to be initiated by the CMP (the Protocol's equivalent of the COP) at least seven years before the end of the existing period. As the Protocol went into force in 2005, negotiations on a second commitment period had to be initiated almost immediately.²⁰ A second commitment period was agreed to at the Durban COP/CMP in 2011.²¹

The Kyoto Protocol is also famous for creating international arrangements designed to help states to more easily meet their domestic emission-reduction obligations. These are the so-called 'flexible mechanisms'. The legal structures put in place to facilitate the mechanisms are some of the most complex of the climate change regime.

The mechanisms create four families of tradable emission allowances: AAs, ERUs, RMUs, and CERs. Each emission allowance has the same value: 1 ton of CO₂ eq. The four families are distinguished by the rules that govern their creation, use, and lifespan: CERs are created by the Clean Development Mechanism (CDM) under Article 12 of the Protocol (see below); an AA is the unit that denominates an Annex I party's 'assigned amount' for a commitment period (e.g. Australia's assigned amount of 2,957.6 Mt CO₂ eq. for 2008–2012 equates to about 3 billion AAs); ERUs are created by the Joint Implementation scheme outlined in Article 6 of the Protocol. The land-use, land-use change, and forestry (LULUCF) sector of an Annex I country, by sequestering carbon, can generate ERUs.

Together, these tradable permits are the currency of the Kyoto Protocol's economy. In a jurisdiction where all GHG emissions are accounted for and controlled, any emission must be backed by a permit. Where a country has excess permits (e.g. AAs) it may sell them. Where it has excess emissions – 'excess' in both cases being defined relative to a country's commitment-period ceiling – it must buy permits. This trading market is not limited to Annex I countries, as CERs are generated exclusively in developing parties for sale to developed parties (as explained below). Thus the Protocol's market is a global one albeit still poorly developed.²²

Key mechanisms and institutions of the climate change regime

Reporting and verification

Regulation of communication about national actions might not sound like a very exciting area of international law, yet it is a precondition of international collaboration at every higher policy level.

By the fifth COP, in 1999, the UNFCCC parties had agreed to detailed guidelines on reporting.²³ Reporting under the Convention revolves around the following elements, which are compulsory for Annex I parties:

²⁰ See Kyoto Protocol, Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP). Online. Available HTTP: <<http://unfccc.int/bodies/body/6409.php>> (accessed 2 May 2012).

²¹ Kyoto Protocol, *Decision 1/CMP.7, Outcome of the Work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at Its Sixteenth Session*, 2011.

²² The United States, not being a Protocol party, cannot take part.

²³ Most of the rules on the regulation of state reporting and compliance under the international regime for climate change are to be found in COP and CMP decisions rather than in the treaties themselves. See UNFCCC, *Decision 4/CP.5, Guidelines for the Preparation of National Communications by Parties Included in Annex I to the Convention, Part II: UNFCCC Reporting Guidelines on National Communications* (1999), and UNFCCC, *Guidelines on Reporting and Review* (1999).

- (i) *national communications* by state parties containing information on national GHG emissions, climate-related policies and measures, GHG-emission projections, financial assistance and technology transfer to non-Annex I states, and actions on raising public awareness about climate change;
- (ii) *national GHG inventories*, detailing 'activity data', 'emission factors', and the methodologies used to estimate national emissions. Several decisions and guidance documents elaborate this obligation.²⁴

National communications are submitted by Annex I parties every four to five years. They are prepared based on agreed reporting guidelines.²⁵ They are reviewed by Expert Review Teams (ERTs).²⁶ National GHG inventories are reported annually, on the basis of IPCC methodologies.²⁷ The inventories are also reviewed by ERTs.²⁸

The whole process of national communications and inventories had to be more or less duplicated when the Kyoto Protocol came into effect. The Protocol intensifies the reporting demands on Annex I parties. Under Article 5 of the Protocol, parties are required to establish 'national systems' that facilitate estimation of anthropogenic emissions,²⁹ and pursuant to Article 7 they must report their emissions regularly.³⁰ The additional provisions that form part of the Protocol's reporting system are necessary to determine state compliance during a commitment period including compliance with the emission cap.

At Article 8(3), the Protocol calls on ERTs to carry out 'a thorough and comprehensive technical assessment of all aspects' of a state's national system, including its emission inventory. An ERT has the power to 'adjust'³¹ a state's reported inventory if it does not agree with the state's accounting of its emissions. This would happen where, for example, the ERT has become aware of an incompleteness in the inventory which the state is refusing to acknowledge. The ERT places itself above the state under review, assuming the authority to correct the quantity of emissions the state is reporting.³²

²⁴ Intergovernmental Panel on Climate Change, *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, Geneva: IPCC, 2000; Intergovernmental Panel on Climate Change, *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, Geneva: IPCC, 1996; UNFCCC, *Decision 17/CP.8, Guidelines for the Preparation of National Communications from Parties Not Included in Annex I to the Convention*, 2003; UNFCCC, *Decision 18/CP.8, Guidelines for the Preparation of National Communications by Parties Included in Annex I to the Convention, Part I: UNFCCC Reporting Guidelines on Annual Inventories*, 2002; and UNFCCC, *Decision 19/CP.8, UNFCCC Guidelines for the Technical Review of Greenhouse Gas Inventories from Parties Included in Annex I to the Convention*, 2002.

²⁵ UNFCCC, *Decision 4/CP.5*.

²⁶ UNFCCC, *Decision 2/CP.1, Review of First Communications from the Parties Included in Annex I to the Convention*, 1995.

²⁷ UNFCCC, *Decision 18/CP.8*.

²⁸ UNFCCC, *Decision 19/CP.8*.

²⁹ Kyoto Protocol, Art. 5.1. See also Kyoto Protocol, *Decision 19/CMP.1, Guidelines for National Systems under Article 5, Paragraph 1 of the Kyoto Protocol* (30 March 2006).

³⁰ Kyoto Protocol, *Decision 15/CMP.1, Guidelines for the Preparation of the Information Required under Article 7 of the Kyoto Protocol* (30 March 2006).

³¹ Kyoto Protocol, Art. 5.2. See also Kyoto Protocol, *Decision 20/CMP.1, Good Practice Guidance and Adjustments under Article 5, Paragraph 2 of the Kyoto Protocol* (30 March 2006).

³² For more on the ERT process, see A. Zahar, 'Verifying Greenhouse Gas Emissions of Annex I Parties: Methods We Have and Methods We Want', *Climate Law* 1(3), 2010, 409.

In a 2007 synthesis report based on the fourth national communications of 39 Annex I countries, the UNFCCC Secretariat noted that the parties had generally implemented varied portfolios of policies and measures to mitigate GHG emissions. These included emission-pricing mechanisms (e.g. carbon taxes and, in the energy industries, tradable emission allowances); barrier-reduction policies aimed at overcoming financial and market barriers to the deployment of existing climate-friendly technologies (e.g. feed-in tariffs and green certificates for energy from renewables); energy- and performance-efficiency measures (including regulatory measures and voluntary sectoral commitments for fuel economy in cars); and regulations affecting product and building standards in the residential and commercial sectors.³³

The synthesis report also found that Annex I parties were increasingly preferring harder (economic and regulatory) instruments over softer (voluntary) instruments to elicit emission reductions. Innovative forms of regulation, in particular tradable certificate systems, were growing more quickly and were more widely in use by 2007 than was the case in years covered by earlier national communications, with the European Union's Emission Trading Scheme standing out for its scale.³⁴ Parties were increasing their use of 'multilevel governance' – action across several levels of government (local to national) as well as horizontally across governmental departments.³⁵

The report also noted shortcomings in the national communications. Annex I countries were not reporting on all the elements of their response to climate change, and not all parties had tried to estimate the actual effects of their policies and measures, in particular on GHG mitigation.³⁶ By any measure, though, barely a decade into the UNFCCC's life, a sophisticated system of reporting relevant to climate governance had emerged among Annex I states, at a high level of compliance.

Compliance system (Kyoto Protocol)

The Kyoto Protocol's compliance system is adumbrated in Article 18 of the treaty and fleshed out in CMP decisions. It applies only to the Protocol's Annex I parties.³⁷ The presence of a 'compliance' system in the Protocol is a measure of the strong 'legal force' that the contracting parties wished to impart through the instrument.

The Kyoto Protocol's Compliance Committee became operational in 2006.³⁸ It is an independent body, whose members and alternate members are sworn to impartiality and conscientiousness in decision-making.³⁹ The Committee has two branches: the Facilitative Branch and the Enforcement Branch. The mandate of the Facilitative Branch is to provide advice and facilitation to states in implementing the Protocol and to 'promote' compliance by parties with emission limitation commitments. To remedy situations, the Branch is empowered to

³³ UNFCCC Secretariat, *Compilation and Synthesis Executive Summary*, p. 6.

³⁴ *Ibid.*, p. 7.

³⁵ *Ibid.*, p. 8.

³⁶ *Ibid.*, p. 12.

³⁷ Kyoto Protocol, *Decision 27/CMP.1, Procedures and Mechanisms Relating to Compliance under the Kyoto Protocol* (30 March 2006).

³⁸ Compliance Committee (Kyoto Protocol), *Report on the First Meeting* (29 May 2006).

³⁹ The Kyoto compliance system has been analysed from many angles in J. Brunnée, M. Doelle and L. Rajamani (eds) *Promoting Compliance in an Evolving Climate Regime*, Cambridge: Cambridge University Press, 2011.

provide advice to a state regarding implementation, as well as facilitate financial and technical assistance.⁴⁰

The Enforcement Branch is of quite a different character. It is made up of legal experts. Questions that the Enforcement Branch is limited to dealing with are laid down in the CMP decision containing the Compliance Committee's procedures and mechanisms. The Enforcement Branch is responsible for determining whether an Annex I party is in compliance with:

- (a) its quantified emission limitation or reduction commitment [i.e. its emission cap] under Article 3, paragraph 1, of the Protocol;
- (b) the methodological and reporting requirements under Article 5, paragraphs 1 and 2, and Article 7, paragraphs 1 and 4, of the Protocol; and
- (c) the eligibility requirements under Articles 6 [Joint Implementation], 12 [Clean Development Mechanism] and 17 [international emissions trading] of the Protocol.⁴¹

In the case of a finding of non-compliance, the Enforcement Branch has to apply 'consequences'. The Branch has no discretion in the application of the consequences at its disposal. In line with its mandate, it must apply the consequences tied to the aforementioned three possible kinds of non-compliance.⁴²

The most interesting 'consequence' relates to the situation where a party has failed to comply with its emission cap. In such a case, the Enforcement Branch must deduct 1.3 times the excess tons of CO₂ eq. from the party's assigned amount for the *next* commitment period – imposing, in effect, a penalty of 30 per cent for every ton of excess emissions. A country in non-compliance with its 2008–2012 target has 100 days after the ERT's review of its final emission inventory to make up any shortfall (that is, to buy international credits, in the form of AAUs, CERs, etc.). Thus, this most interesting of issues could not be raised before the Enforcement Branch until at least a year after the end of the first commitment period in 2012. Until then, the power must remain untested.

The initiating action for both branches of the Compliance Committee is a 'question of implementation' raised by an ERT. The Bureau of the Compliance Committee decides whether to assign a question of implementation to the Facilitative Branch or the Enforcement Branch. The Facilitative Branch's powers have remained somewhat theoretical, as the Bureau has never received a question of implementation appropriate for the Facilitative Branch.⁴³ All questions of implementation to date have been directed to the Enforcement Branch.

In the international climate regime, the Enforcement Branch of the Kyoto Protocol's Compliance Committee is most like a court, in that it hears evidence, follows rules of procedure, is sensitive to due process, and speaks through written decisions. The country under scrutiny by the Enforcement Branch may make written submissions and request a hearing to

⁴⁰ UNFCCC, An Introduction to the Kyoto Protocol Compliance Mechanism. Online. Available HTTP: <http://unfccc.int/kyoto_protocol/compliance/items/3024.php> (accessed 2 May 2012).

⁴¹ Kyoto Protocol, *Decision 27/CMP.1*, at Part V(4).

⁴² Ibid., section XV.

⁴³ The CMP is considering ways to improve the usefulness of the Facilitative Branch; see Compliance Committee (Kyoto Protocol), *Annual Report of the Compliance Committee to the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol* (3 November 2011), para. 48ff.

present its views. The Branch has the power to call upon expert advice to supplement evidence it has received from the ERT and the state party.⁴⁴

Where non-compliance is found, the Enforcement Branch must make a public declaration of state non-compliance, and must also make public the ‘consequences’ it has applied. The CMP plenary of the parties can receive an ‘appeal’ from a state party dissatisfied with a decision of the Enforcement Branch.⁴⁵ However, these quasi-appeals are limited to questioning a decision of the Enforcement Branch which relates to emission targets about which the state concerned claims to have been denied due process.⁴⁶ If the CMP considers that the state has indeed been treated unfairly, it does not have the authority to decide the question of implementation itself; it must refer it back to the Enforcement Branch.⁴⁷

Oberthür and Lefebvre argue that this unusual limitation on the power of states, along with the fact that the CMP is not required to confirm the decisions of either branch of the Compliance Committee on questions of implementation, ‘shield[s] the quasi-judicial decision-making of the Committee from political interference’.⁴⁸

Clean Development Mechanism (Kyoto Protocol)

Article 12 of the Kyoto Protocol establishes the CDM as a mechanism for *non*-Annex I parties to achieve sustainable development. In the process, the mechanism assists *Annex I* parties to comply with their emission reduction commitments under the Protocol.⁴⁹

Article 12 creates an Executive Board under the authority of the CMP to supervise the CDM.⁵⁰ The Board is effectively the market regulator for CDM offsets. It delegates regulatory functions to other actors, who consequently play quasi-regulatory roles.⁵¹ For example, private ‘operational entities’ certify emission reductions realised by CDM projects. Here, the Kyoto Protocol differs from the traditional state-centric model of international law. It makes public and private entities subject to the CDM, establishing international bodies that

⁴⁴ See M. Doelle, ‘Early Experience with the Kyoto Compliance System: Possible Lessons for MEA Compliance System Design’, *Climate Law* 1(2), 2010, 237.

⁴⁵ S. Oberthür and R. Lefebvre, ‘Holding Countries to Account: The Kyoto Protocol’s Compliance System Revisited after Four Years of Experience’, *Climate Law* 1(1), 2010, 133, pp. 150–1.

⁴⁶ Kyoto Protocol, *Decision 27/CMP.1*, section XI.

⁴⁷ *Ibid.*, sections XI.3 and XI.4.

⁴⁸ Oberthür and Lefebvre, *op. cit.*, p. 140.

⁴⁹ The history of the CDM’s emergence in the international negotiations has been discussed by several authors. See S. Mathy, J.-C. Hourcade and C. de Gouvello, ‘Clean Development Mechanism: Leverage for Development?’, *Climate Policy* 1, 2001, 251; A. Michaelowa, ‘Creating the Foundations for Host Country Participation in the CDM: Experiences and Challenges in CDM Capacity Building’, in F. Yamin (ed.) *Climate Change and Carbon Markets – a Handbook of Emission Reduction Mechanisms*, London: Earthscan, 2005; J. Ellisa, H. Winkler, J. Corfee-Morlot and F. Gagnon-Lebrun, ‘CDM: Taking Stock and Looking Forward’, *Energy Policy* 35(1), 2007, 15; and the articles collected in D. Freestone and C. Streck (eds) *Legal Aspects of Implementing the Kyoto Protocol Mechanisms: Making Kyoto Work*, Oxford: Oxford University Press, 2005, especially D. Freestone, ‘The UN Framework Convention on Climate Change, the Kyoto Protocol, and the Kyoto Mechanisms’, pp. 3–24.

⁵⁰ The supervision function is detailed in Kyoto Protocol, *Decision 3/CMP.1, Modalities and Procedures for a Clean Development Mechanism as Defined in Article 12 of the Kyoto Protocol* (30 March 2006), paras 2–4.

⁵¹ C. Streck and J. Lin, ‘Mobilising Finance for Climate Change Mitigation: Private Sector Involvement in International Carbon Finance Mechanisms’, *Melbourne Journal of International Law* 10(1), 2009, 70, p. 73.

administer the Kyoto Protocol mechanisms directly, and entering into relationships with private entities participating in these mechanisms.⁵² The relationship between treaty-based international institutions (the CMP, the CDM Executive Board) and a private entity incorporated under state domestic law raises unusual legal issues. In fact, the CDM is a thicket of transnational and what might be called ‘trans-scalar’ (private-to-international) legal relationships. Private or public project developers create the emission reductions; private or public entities certify them; private or public or international organisations or state sovereigns purchase the emission reduction certificates; public and international bodies oversee their accounting and cancellation; and so on (see Table 20.4.)

The Protocol’s Article 12 calls on the CMP to ‘elaborate modalities and procedures with the objective of ensuring transparency, efficiency and accountability through independent auditing and verification of [CDM] project activities’.⁵³ To understand why this is necessary, we need to consider the CDM’s logic.

The CDM is a system for the creation of emission *offsets*. This is a key point about the CDM: because it is an offset system, it does not lead to overall emission reductions. It operates to cancel out ‘excess’ emissions in countries with emission caps. In general, to create an offset, all of the following conditions must be met.

There must be:

- (i) a proposed project, which
- (ii) itself would not have been realised but for the expected proceeds from the sale of the offsets, and which
- (iii) acts as a sink for, or destroys, GHGs, or creates a product or service that substitutes itself for (i.e. displaces) an existing or planned and comparatively more GHG-intensive product or service, and
- (iv) the quantity of GHGs removed or avoided through the project is reasonably quantifiable.

The CDM’s logic is thus difficult!

The CDM-produced emission reduction is parcelled up into a tradable commodity (CERs) and sold to an Annex I government, or to an industry based in an Annex I country, as an emission allowance.

Against this basic formulation of the CDM’s logic we are better able to appreciate the insistence of the Kyoto Protocol that CDM emission reductions are to deliver ‘real, measurable, and long-term benefits related to the mitigation of climate change’ which ‘are additional to any that would occur in the absence of the certified project activity’.⁵⁴ We also appreciate the need for a system that verifies and monitors CDM projects. The greater the divergence between the notional ‘baseline’ (i.e. business as usual) and the emission trajectory realised through the implementation of the CDM project, the greater the value of the project (because the larger the number of CERs issued). The baseline is a counterfactual scenario which by definition cannot be known with certainty; it will always be an estimate. If the baseline is wrongly set (if it has a large margin of error), not only is a CER’s value questionable, the

⁵² Ibid., p. 79.

⁵³ Kyoto Protocol, Art. 12(7).

⁵⁴ Ibid., Art. 12(5).

CDM's environmental integrity suffers. The CDM requires strong regulation to maintain its credibility from an environmental point of view as an offset provider.⁵⁵

Table 20.4 Simplified CDM procedure, from project proposal to CER issuance⁵⁶

Project proposal

The project's compliance with CDM rules is assessed on the basis of the Project Design Document (PDD). The project developer prepares the PDD making use of an approved emission baseline-and-monitoring methodology. Non-CDM finance is usually necessary to cover the up-front costs of project development and initial implementation.

↓

Validation

Validation is the independent assessment of the project's compliance with CDM rules by a Designated Operational Entity (DOE). The DOE is an independent auditor (a private-sector consultant) approved by the CDM Executive Board.

↓

Application for registration

If the DOE determines that the requirements for a CDM project have been met, the DOE, on behalf of the project developer, requests the Executive Board to register the project.

↓

Registration

Registration constitutes formal approval of a CDM project. It is a prerequisite for the verification/certification of the project and issuance of CERs.

↓

Monitoring (ongoing)

The project developer is responsible for monitoring actual emissions of the project (or, where there are no emissions, monitoring the project output which displaces emissions elsewhere), in accordance with the monitoring requirements of the applicable CDM methodology (the 'monitoring plan').

↓

Verification and certification

After a certain period of operation of the project, a DOE verifies that emission reductions have taken place in the amount claimed in the monitoring plan. The verification report is followed by certification, which is the DOE's assurance to the CDM Executive Board that the emission reductions have been verified.

↓

CER issuance

The DOE submits its verification report and certification to the Executive Board with a request for the issuance of CERs. In the normal course of events, the Board will issue CERs on the basis of the DOE's submission. By January 2012, the Board had registered 3,771 projects and issued 826.3 million CERs.⁵⁷

↓

(Continued overleaf)

⁵⁵ See E. Meijer and J. Werksman, 'Keeping It Clean – Safeguarding the Environmental Integrity of the Clean Development Mechanism', in D. Freestone and C. Streck (eds) *Legal Aspects of Implementing the Kyoto Protocol Mechanisms: Making Kyoto Work*, Oxford: Oxford University Press, 2005, pp. 191–211.

⁵⁶ See also Kyoto Protocol, *Decision 3/CMP.1*, and Clean Development Mechanism (Kyoto Protocol), *CDM Methodology Booklet*, UNFCCC, 2010, p. 11. For a diagram of the process, see UNFCCC, CDM Project Cycle. Online. Available HTTP: <<http://cdm.unfccc.int/Projects/diagram.html>> (accessed 2 May 2012).

⁵⁷ UNFCCC, CDM Home. Online. Available HTTP: <<http://cdm.unfccc.int/>> (accessed 2 May 2012).

Table 20.4 Continued

Adaptation Fund tax (2%)

Article 12(8) of the Kyoto Protocol provides that proceeds from CDM projects are to be used 'to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation'. On this basis, two per cent of CERs issued to a project are redirected to the Protocol's Adaptation Fund.⁵⁸

↓

CER sale

When the CERs are received by the project developer, they are sold in the compliance or voluntary markets. The proceeds fund the ongoing operation of the project or are used to pay back the investor who covered the project's up-front operating costs.

Reducing emissions from deforestation (UNFCCC)

Forests have played a relatively minor role in the international climate change regime to date. The UNFCCC, at Article 4(1)(d), contains only a very general commitment by all parties to the sustainable management, conservation, and enhancement of forests – following which the subject is not taken up again in the treaty text. This is not because the value of forests in climate control is questioned – on the contrary, it is widely appreciated that in sequestering carbon while standing, or releasing carbon dioxide when felled, forests and deforestation have a major impact on climate change. The reason why forest-based mitigation has been very nearly excluded from the international regime has to do with the sheer practical difficulties involved, at every level, in any global effort to protect or augment the world's forests. In this section we focus on efforts now being made, within the framework of the UNFCCC, to agree to a scheme for the reduction of emissions from deforestation and forest degradation in developing countries – the scheme known as REDD.⁵⁹

Assuming that REDD is successfully established, it will, like the CDM, raise money from Annex I investors to purchase emission reductions in developing countries. With REDD, the reductions will be created primarily by deforestation and degradation prevention projects established in developing countries. There is potential for REDD to go even further than anti-deforestation and anti-degradation, potentially generating credits from forest conservation and forest-enhancement activities. This more ambitious form of REDD is known as REDD-plus.⁶⁰

As discussed in the CDM section of this chapter, the generation of emission reductions presupposes proof of two emission trajectories: a counterfactual trajectory which *would have* materialised in the normal course of events (in the absence of the project), and an emission trajectory that factors in the operation of the project. The CDM/REDD logic is the same in this respect. Where REDD differs from the CDM is in its exclusive focus on forests. Also, it is ideologically inclined to conceive of a country's forests holistically, as a single entity. The

⁵⁸ Kyoto Protocol, *Decision 3/CMP.1*, para. 66(a). In June 2011, the share of proceeds from CDM project activities for the Adaptation Fund stood at around US\$13 million; see UNFCCC, *Share of Proceeds from the Clean Development Mechanism Project Activities for the Adaptation Fund*. Online. Available HTTP: <<http://cdm.unfccc.int/Issuance/SOPByProjectsTable.html>> (accessed 9 May 2012).

⁵⁹ More discussion of these matters will be found in [Chapter 39](#) of this volume by Rowena Maguire.

⁶⁰ For simplicity, I employ the term REDD to mean both.

CDM, by contrast, has no necessary holistic outlook, operating through a variety of usually piecemeal, unrelated projects, very few of which (less than 1 per cent⁶¹) are forestry projects.

In the final analysis, what REDD-simpler would do is pay people to leave forests alone. Under REDD-plus, it would pay people to look after forests and improve them. Most of the money would ultimately come from Annex I governments, although much of the initial investment would probably come from non-government sources, aiming to create the REDD credits and then sell them on to Annex I governments.

The development of a REDD mechanism was first endorsed by the UNFCCC parties at their conference in Bali in 2007. The task was incorporated into a broad, initially two-year, negotiating track on long-term cooperative action (LCA) outlined in the Bali Action Plan (BAP).⁶² The BAP urged parties in the LCA negotiations to consider 'Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries' (basic REDD), as well as conservation, sustainable management of forests, and enhancement of forest-carbon stocks (REDD-plus).⁶³ A second decision at Bali gave parties the green light to proceed with REDD-related actions of their own, voluntarily.⁶⁴ This decision also tasked the UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA) to commence a programme of work on such methodological issues as the assessment of change in forest cover and associated carbon stocks, methods for setting reference emissions levels (baselines), and methods for demonstrating reduction in emissions from deforestation, as well as reduction in emissions from forest degradation, and so on.⁶⁵ Thus, in a kind of pincer movement against the problem, the parties were to find their own way on the ground while the SBSTA went about building the terminological and technical foundations for a universal, centralised system.

The next landmark decision of the UNFCCC parties on REDD was taken at the Cancun COP in 2010.⁶⁶ The decision calls on developing parties wanting to participate in the scheme to implement a national action plan, a 'national forest reference emission level', a 'transparent' national system for the monitoring and reporting of REDD activities, and an information system on how several 'safeguards' itemised in the decision would be addressed and adhered to throughout the implementation of REDD activities. These safeguards include respect for the knowledge and rights of indigenous people and ensuring their effective participation.⁶⁷ As land tenure issues are central to any scheme that seeks to distribute benefits to people for the protection or improvement of land, the Cancun decision calls on developing countries to clarify the legal status of forest land destined for REDD projects.⁶⁸

In its multilateral manifestation, REDD will be implemented in phases, beginning with the development of national action plans, progressing through capacity-building by means of

61 Clean Development Mechanism (Kyoto Protocol), Distribution of Registered Project Activities by Scope. Online. Available HTTP: <<http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByScopePieChart.html>> (accessed 2 May 2012).

62 UNFCCC, *Decision 1/CP.13, Bali Action Plan* (2007), para. 1.

63 Ibid., para. 1(b)(iii).

64 UNFCCC, *Decision 2/CP.13, Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action* (2007), paras 3–4.

65 Ibid., para. 7(a).

66 UNFCCC, *Decision 1/CP.16, The Cancun Agreements: Outcome of the Work of the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention* (2010), paras 68–79.

67 Ibid., para. 71 and Appendix I.

68 Ibid., para. 72.

demonstration activities, and evolving into broader country-based actions that are measured, reported, and verified.⁶⁹ Funding for the early phases of REDD deployment is being sought through bilateral and multilateral channels, as well as private investors, while the financing of the later phases has yet to be worked out.⁷⁰ Administratively, REDD is a much larger, riskier, and politically invasive programme than the CDM. 'A future REDD regime should operate at the national level in order to reduce the risk of within-country leakage.'⁷¹ Forests must be protected as wholes, and, for this, the power of the state must be enlisted.⁷²

If REDD is realised in its ideal form, it might become a close equivalent of an international convention on forests. Savaresi writes that 'REDD may still present a triple-win solution for climate change, sustainable development, and biodiversity conservation.'⁷³ It is as yet too early to know whether the regime for REDD will succeed in becoming fully established, or, if it does succeed, what its reputation will be for environmental integrity. Moreover, REDD's success (like the CDM's) depends upon state emission caps and a healthy carbon market. Because 'market-based approaches only work in the context of a constrained system',⁷⁴ because no obligatory limits on global emissions have ever been agreed to, and because after 2012 fewer Annex I countries will have obligatory emission caps under the Kyoto Protocol, the carbon market could weaken with time, causing the price of credits to fall and investment in carbon reduction projects and grand schemes like REDD to fall with it.⁷⁵

Finance and technology transfer

This section discusses the climate regime's regulation of the transfer of finance and technology from developed to developing countries in the interests of climate change mitigation and adaptation. Much of the transfer in wealth and knowledge that occurs under this heading is aimed at building up resident expertise in developing countries (capacity-building⁷⁶) and nudging economic development in the direction of greater sustainability (technological leap-frogging). In the context of climate change, aiding sustainability means helping developing countries to cope with the expected climate impacts better than they would have otherwise, that is, with greater 'resilience' and less human suffering, while also *growing their economies*.

Raising money internationally, moving it around the world to wherever it is needed most, in an orderly, fair, and accountable manner, and spending it to procure the desired results of climate change mitigation or adaptation, subject to measurement, reporting, and verification,

⁶⁹ Ibid., para. 73.

⁷⁰ Ibid., para. 77.

⁷¹ C. Parker, A. Mitchell, M. Trivedi and N. Mardas, *Little REDD Book: A Guide to Governmental and Non-Governmental Proposals for Reducing Emissions from Deforestation and Degradation*, Oxford: Global Canopy Programme, 2008, p. 45.

⁷² See also C. Streck and J. Lin, op. cit., p. 97. See also N.R. Virgilio, S. Marshall, O. Zerbock and C. Holmes, *Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of on-the-ground Experience*, Arlington, VA: The Nature Conservancy, 2010, p. 6.

⁷³ A. Savaresi, 'Forests, Economics, and Climate Change', *Climate Law* 2(3), 2011, 439, p. 446.

⁷⁴ International Institute for Sustainable Development, 'SB 34 and AWG Highlights: Monday, 13 June 2011', *Earth Negotiations Bulletin* 12 (509), 2011, 1, p. 1.

⁷⁵ As early as 2010 there was evidence that the global carbon market was flagging. See World Bank, *State and Trends of the Carbon Market 2010*, Washington DC: World Bank, 2011, p. 9.

⁷⁶ On the UNFCCC's foundational definition of capacity-building, see UNFCCC, *Decision 2/CP.7, Capacity Building in Developing Countries (Non-Annex I Parties)* (21 January 2002); and UNFCCC, *Decision 1/CP.16*, para. 130.

are actions that must be meticulously planned, regulated, and overseen, on a plane that is above that of domestic law, yet engages with it. The money must be able to unlock ideas, know-how, and concrete applications and not trample on human rights or create new threats to society or the environment.

The CDM is itself a mechanism for finance and technology transfer.⁷⁷ While it does not have a technology transfer mandate, it contributes to technology transfer by financing emission reduction projects using technologies currently unavailable in host countries.⁷⁸ Yet, the CDM's focus is on mitigation rather than adaptation, and its projects have been concentrated in countries where offsets can be most easily, safely, and cheaply produced, not necessarily where finance and technology are needed most. Thus the CDM's vision is limited.

Article 4(3) of the UNFCCC calls on developed countries, and in particular Annex II countries, to assist developing countries through finance and technology transfer (see Table 20.2). It further provides, at 4(4), that the Annex I parties are to assist developing-country parties 'that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation' (effects like flood, drought, and desertification). Following this, Article 4(5) states that:

The developed country Parties . . . shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties . . . In this process, the developed country Parties shall support the development and enhancement of endogenous capacities and technologies of developing country Parties.

This is further developed in Article 4(7), which additionally contains an unambiguously stated *quid pro quo*: unless finance and technology can be made to flow from the highly privileged states to the weak and most vulnerable, implementation of other features of the UNFCCC's climate change regime will seize up.

In addition to the above, the UNFCCC, in Articles 11 and 21(3), provides that financial transfers, including funds to enable the transfer of technology, are to be administered by a 'financial mechanism' accountable to the COP. There is no detail in the Convention about how the mechanism would work. The Global Environment Facility (GEF),⁷⁹ which was already in existence at the time the UNFCCC was opened for signature, was restructured to play a role under the Convention's financial mechanism.

As to technology transfer in particular, the Convention, at Article 4(1)(h), calls on all parties to 'Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change'. The Convention's SBSTA was given the task, among others, of

⁷⁷ The UNFCCC has a web page on the subject: UNFCCC, *The CDM and Technology Transfer*. Online. Available HTTP: <http://cdm.unfccc.int/about/CDM_TT/index.html> (accessed 2 May 2012).

⁷⁸ UNFCCC, *The Contribution of the Clean Development Mechanism under the Kyoto Protocol to Technology Transfer*, UNFCCC, 2010.

⁷⁹ On the GEF, see Global Environment Facility, 'What Is the GEF?'. Online. Available HTTP: <<http://www.thegef.org/gef/whatisgef>> (accessed 2 May 2012); C. Streck, 'The Global Environment Facility – a Role Model for International Governance?', *Global Environmental Politics* 1(2), 2001, 71.

advising the COP ‘on the ways and means of promoting development and/or transferring’ the relevant technologies to non-Annex I countries.⁸⁰

The legal obligations laid out in the Convention were extended somewhat by the Kyoto Protocol’s Articles 10(c) and 11(2)(b). However, little progress was made in these matters prior to the Bali COP in 2007. The Bali Action Plan prioritised:

Enhanced national/international action on mitigation of climate change, including, *inter alia*, consideration of: . . . (ii) Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner.⁸¹

The BAP developed the call for ‘enhanced action’ in finance and technology transfer in relative detail.⁸² While this was an advance on the UNFCCC and the text of the Kyoto Protocol, in relation to the central issue of how technological and financial support for developing countries should be generated, governed, and delivered, as well as on technological cooperation, the BAP was still no more than a plan through which subsequent negotiations were to be structured.

At the Copenhagen meeting in December 2009, the parties to the Copenhagen Accord agreed that they would raise money to help poor countries respond to climate change: US\$30 billion over the period from 2010 to 2012 (the so-called ‘fast-start’ finance), rising to US\$100 billion *per year* by 2020. It was promised as ‘new’ money.⁸³ A year later, at the Cancun COP, the UNFCCC parties reaffirmed the sums promised in the Copenhagen Accord.⁸⁴ In exchange for the promise of enhanced financial support, developing countries agreed to implement Nationally Appropriate Mitigation Actions (NAMAs), the effect of which would be a deviation from projected emissions in these countries through to 2020.⁸⁵

The Cancun conference also formalised the existence of two institutions created by the Accord the year before.⁸⁶ They are the Green Climate Fund and the Technology Mechanism. The Technology Mechanism is made up of the Technology Executive Committee and the Climate Technology Centre and Network.⁸⁷ A large share of the promised international funding is to flow through the Green Climate Fund.⁸⁸ The UNFCCC parties have set up a Transitional Committee to develop the operational features of the Fund.⁸⁹

Where will the promised money come from? In December 2009, the UN Secretary-General appointed a High-Level Advisory Group on Climate Change Financing to study potential sources of revenue to meet the Annex I parties’ Copenhagen commitments. The

⁸⁰ UNFCCC, Art. 9(2)(c).

⁸¹ UNFCCC, *Bali Action Plan*, paras 1(b)(i) and (ii).

⁸² *Ibid.*, paras 1(d) and 1(e).

⁸³ UNFCCC, *Decision 2/CP.15, Copenhagen Accord* (2009), para. 8 (reiterated in UNFCCC, *Decision 1/CP.16*, paras 95 and 98).

⁸⁴ UNFCCC, *Decision 1/CP.16*.

⁸⁵ *Ibid.*, para. 48.

⁸⁶ See UNFCCC, *Copenhagen Accord*, para. 8 (Copenhagen Green Climate Fund), and para. 11 (Technology Mechanism).

⁸⁷ UNFCCC, *Decision 1/CP.16*, para. 117.

⁸⁸ *Ibid.*, para. 100.

⁸⁹ *Ibid.*, paras 102–12.

Advisory Group concluded that the largest chunk of the promised revenue would have to come from pricing GHG emissions globally:

Based on a carbon price of US\$20–US\$25 per ton of CO₂ equivalent, auctions of emission allowances and domestic carbon taxes in developed countries with up to 10 per cent of total revenues allocated for international climate action could potentially mobilize around US\$30 billion annually. Without underestimating the difficulties to be resolved, particularly in terms of national sovereignty and incidence on developing countries, approximately US\$10 billion annually could be raised from carbon pricing international transportation, assuming no net incidence on developing countries and earmarking between 25 and 50 per cent of total revenues. Up to US\$10 billion could be mobilized from other instruments, such as the redeployment of fossil fuel subsidies in developed countries or some form of financial transaction tax, though diverging views will make it difficult to implement this universally.⁹⁰

In the best case, then, the above-listed methods might raise half the annual amount required by 2020 – i.e. US\$50 billion out of the US\$100 billion per year. The case assumes that cap-and-trade or equivalent systems for raising carbon revenue will soon be established in all major industrialised economies. It requires us to imagine that, for example, the United States will have priced its national emissions by the end of this decade. This is a possibility which, for the moment, seems unlikely.

According to the Advisory Group, the other half of the required amount will have to come from several relatively obscure and speculative sources, as well as from the most obvious of sources: Annex I states' general fiscal revenue (new taxes). About the latter source, the Advisory Group wrote: 'The political acceptability of such sources will depend on national circumstances and on the domestic fiscal environment, which has currently put many developed countries under extreme pressure.'⁹¹

The sources of finance for the considerable North–South flows promised in Copenhagen and reiterated in Cancun are thus still only a vague and uncertain idea which awaits systematic exploration at the COP level. The Durban COP at the end of 2011 did not make any progress on clarifying longer-term funding sources.

Conclusion: the way the wind blows

The scientific community's verdict on the climate change negotiations is increasingly dismissive. Commenting on the 2011 Durban COP's outcome, Tollefson writes that 'the platform represents an exercise in legalese that does little or nothing to reduce emissions, and defers action for almost a decade.'⁹² *Nature's* editors were even more scathing: 'It takes a certain kind of optimism – or an outbreak of collective Stockholm syndrome – to see the Durban outcome as a significant breakthrough on global warming . . . It is clear that the science of climate change and the politics of climate change, which claims

⁹⁰ M. Zenawi and J. Stoltenberg, *Report of the Secretary-General's High-Level Advisory Group on Climate Change Financing*, Geneva: United Nations, 5 November 2010, pp. 5–6.

⁹¹ *Ibid.*, p. 6.

⁹² J. Tollefson, 'Durban Maps Path to Climate Treaty', *Nature* 480, 2011, p. 299.

to represent it, now inhabit parallel worlds.’⁹³ One world – the world of politicians and UNFCCC negotiators – is delighted to see a climate change regime still actually in place, hobbling along, making a difference to emissions, however slight. The other world, of climate scientists, sees only the rapidly worsening evidence as measured by their instruments.

Does the history to date of the climate change regime warrant optimism or pessimism about the future? Is it rational to believe that we will ‘prevent dangerous anthropogenic interference with the climate system’? One approach to answering this question is to ask how committed we are, realistically, to burning fossil fuels into the future?

Between 1980 and 2007 world primary energy demand,⁹⁴ mainly met by fossil fuels, grew by two per cent per year. Under an optimistic scenario in which states take action to *reduce* their dependence on fossil fuel energy, the International Energy Agency (IEA) forecasts continued growth in primary energy demand between 2008 and 2035 at a rate of 1.2 per cent per year, with fossil fuels accounting for more than half of the increase.⁹⁵ Under all IEA scenarios, even the most optimistic, fossil fuels remain the dominant energy source in 2035 (the outer year of the projection).⁹⁶

In the most likely IEA case for 2035, oil’s share drops to 28 per cent (from 33 per cent in 2008), demand for coal rises through to around 2020 and starts to decline closer to 2035, and demand for natural gas (which has lower carbon emissions per unit of energy) surpasses that of other fossil fuels throughout the period.⁹⁷ Under this scenario (which of course must be qualified by our ignorance of many future factors), annual energy-related emissions of GHGs rise from 29 gigatonnes CO₂ eq. in 2008 to 35 gigatonnes in 2035 (a 17 per cent increase).⁹⁸ The IEA predicts that 93 per cent of the projected increase in world primary energy demand will be in non-OECD countries.⁹⁹ Back in 2000, when the United States was still the world’s largest energy user, its energy consumption was twice the size of China’s. By 2009, China had overtaken the United States to become the world’s largest consumer of energy.¹⁰⁰ China’s huge domestic market was, in 2010, underdeveloped, with per capita energy consumption at only one-third of the OECD average.¹⁰¹ In terms of electricity supply, China is projected to add, in just fifteen years, a generating capacity equivalent to the 2010 installed capacity of the whole of the United States.¹⁰² Most of it will be coal-fired.¹⁰³

Human population growth will continue to outstrip the ability of governments to meet the growing demand for energy, thus maintaining a long tail of unmet energy demand. In 2010, 1.4 billion people (over 20 per cent of the world’s population) lacked access to

⁹³ Editorial, ‘The Mask Slips’, *Nature* 480, 2011, p. 292.

⁹⁴ For the IEA’s definition of ‘primary energy demand’, see International Energy Agency, *World Energy Outlook 2009*, IEA, 2009, p. 670.

⁹⁵ International Energy Agency, *World Energy Outlook 2010: Executive Summary*, IEA, 2010, pp. 4–5.

⁹⁶ *Ibid.*, p. 4.

⁹⁷ *Ibid.*, p. 5.

⁹⁸ *Ibid.*, p. 11.

⁹⁹ *Ibid.*, p. 5.

¹⁰⁰ *Ibid.*, p. 5.

¹⁰¹ *Ibid.*, p. 5.

¹⁰² *Ibid.*, p. 8.

¹⁰³ A. Petherick, ‘Dirty Money’, *Nature Climate Change* 2, 2012, p. 73.

electricity.¹⁰⁴ With the population in developing countries expected to grow by many hundreds of millions by 2030, the IEA predicts that, even by that date, 1.2 billion people will still have no access to electricity.¹⁰⁵ For decades ahead, then, there will exist an enormous suppressed demand for energy which gradual increases in wealth will unleash.

Wealth will eventually come to places like Africa. The African population now is mostly poor (the gross national income per capita in sub-Saharan Africa was \$1,126 in 2009¹⁰⁶), poorly governed (many governments in Africa are corrupt and undemocratic),¹⁰⁷ and there are few public services. As a result, the indicators in all areas of life in Africa are miserable:

- child mortality for the continent as a whole during the period from 2005 to 2010 was 82.6 infant deaths per 1,000 live births (compared with 4.1 in Western Europe),¹⁰⁸
- in sub-Saharan Africa in 2008 life expectancy at birth was only 52 years,¹⁰⁹
- in the same region in the same year the completion rate for *primary* school was 64 per cent,¹¹⁰
- personal security and the rule of law are still a dream for most Africans,¹¹¹
- the development of Africa's agricultural and manufacturing sectors is a 'dismal' twin-failure, according to the International Labour Office,¹¹²
- persons holding jobs are mostly not occupied in 'decent work' (a technical term): in 2009, 63.7 per cent of those with 'jobs' in Africa's least-developed countries were the working poor (defined by an income not exceeding \$1.25 per day),¹¹³

¹⁰⁴ International Energy Agency, *World Energy Outlook 2010*, p. 14. In Kenya and Uganda, for example, only one per cent of the rural households had access to electricity in 2004: S. Karekezi and J. Kimani, 'Have Power Sector Reforms Increased Access to Electricity among the Poor in East Africa?', *Energy for Sustainable Development* 8(4), 2004, p. 10. Having no access to electricity, poor people use LPG where it is affordable, or else fall back on kerosene and charcoal or other biomass; see e.g. G. Bravo, R. Kozulj and R. Landaveri, 'Energy Access in Urban and Peri-Urban Buenos Aires', *Energy for Sustainable Development* 12(4), 2008, 56; S. Karekezi, J. Kimani and O. Onguru, 'Energy Access among the Urban Poor in Kenya', *Energy for Sustainable Development* 12(4), 2008, 38.

¹⁰⁵ International Energy Agency, *World Energy Outlook 2010*, p. 14.

¹⁰⁶ The World Bank. Online. Available HTTP: <<http://data.worldbank.org/region/SSA>> (accessed 2 May 2012).

¹⁰⁷ According to the Ibrahim Index for 2010, Mauritius was ranked first in governance in Africa with a score of 83/100, Somalia was last with 7.9/100, while about half of all African countries scored below 50 on the scale. Online. Available HTTP: <<http://www.moibrahimfoundation.org/en/section/the-ibrahim-index>> (accessed 2 May 2012). On corruption in Africa, see also International Labour Office, *Growth, Employment and Decent Work in the Least Developed Countries: Report of the International Labour Office for the Fourth Conference on the Least Developed Countries, Istanbul, 9–13 May 2011*, Geneva: ILO, 2011, pp. 45–6.

¹⁰⁸ United Nations, *World Population Prospects: The 2010 Revision*. Online Database. Available HTTP: <<http://esa.un.org/unpd/wpp/index.htm>> (accessed 9 May 2012).

¹⁰⁹ The World Bank. Online. Available HTTP: <<http://data.worldbank.org/region/SSA>> (accessed 2 May 2012).

¹¹⁰ Ibid.

¹¹¹ See the Safety and Rule of Law scores in the Ibrahim Index for 2010, according to which 21 of the 53 African countries score below 50 on a scale to 100. Online. Available HTTP: <<http://www.moibrahimfoundation.org/en/section/the-ibrahim-index>> (accessed 2 May 2012).

¹¹² International Labour Office, *Growth, Employment and Decent Work*, pp. 30–31.

¹¹³ Ibid., p. 8.

- only 19.1 per cent of 'employed' persons in those countries were classed by the International Labour Office as employers or wage-and-salary workers, with the remainder (80.9 per cent) falling into the categories of own-account workers and unpaid family workers – that is, vulnerable and low-productivity employment.¹¹⁴

Under these conditions, even the simplest environmental problems are not likely to be prioritised or effectively addressed in Africa. The values of the majority of Africa's population are focused on securing improvements to basic services, economic opportunities, and human and political rights – not on the distant and abstract problem of climate change. In 2011, in the uprisings which became known as the Arab Spring, the demands of Arabic-speaking populations in northern Africa were made loud and clear; in essence, they were for jobs and better governance. Mediterranean Africa might be wealthier than the sub-Saharan part (Egypt's GNI per capita in 2009 was \$2,070¹¹⁵ and Tunisia's \$3,720¹¹⁶), but the north's relative advantage is no cause for contentment in those countries. Their frame of reference is a relatively prosperous and free Europe across the Mediterranean.

Africa's hoped-for transformation into a continent of strong economic growth means *freedom to prosper*. It is a precondition that tells us something about the likely place of environmental values in the transformation.

According to the IEA, whereas a transformation of the global energy system is urgently needed, little is being done to ensure that it happens quickly enough.¹¹⁷ Non-fossil sources will grow, but all too slowly. Global demand for nuclear power is predicted to increase slightly, with its share rising from 6 per cent in 2008 to 8 per cent in 2035.¹¹⁸ (This estimate pre-dates the 2011 nuclear disaster in Japan.) The use of renewable energy is forecast to triple in absolute terms by 2035, but this increases its share of primary energy demand only from 7 to 14 per cent.¹¹⁹ Hydropower (whose infrastructure takes a severe environmental toll) will continue to dominate.¹²⁰ This is in contrast with electricity produced from solar photovoltaics, which despite its expected very rapid increase is likely to have a share of only 2 per cent of global energy generation by 2035.¹²¹

When considering our historical commitment to fossil fuels, and our commitment to continue burning them in steadily increasing quantities well into the future, we may have the experience of a gulf opening up between the reality of our dependence on carbon emissions and the talk of abatement of climate change at international conferences. As of December 2009, the position of most countries officially became one not of preventing global warming, but of avoiding warming in excess of a global average of 2 degrees Celsius above pre-industrial times.¹²² As part of the Copenhagen Accord, the world's major economies have

¹¹⁴ Ibid., pp. 9, 41.

¹¹⁵ The World Bank. Online. Available HTTP: <<http://data.worldbank.org/country/egypt-arab-republic>> (accessed 2 May 2012).

¹¹⁶ The World Bank. Online. Available HTTP: <<http://data.worldbank.org/country/tunisia>> (accessed 2 May 2012).

¹¹⁷ International Energy Agency, *World Energy Outlook 2010*, p. 3.

¹¹⁸ Ibid., p. 5.

¹¹⁹ Ibid., p. 5.

¹²⁰ Ibid., p. 9.

¹²¹ Ibid., p. 9.

¹²² UNFCCC, *Copenhagen Accord*, para. 2. The two-degree-Celsius target was reaffirmed a year later in a decision of the UNFCCC parties: UNFCCC, *Decision 1/CP.16*, para. 4.

pledged emission reductions for the years following 2012 and up to 2020.¹²³ Countries are still trying to agree on emission cuts that would put them on a trajectory that keeps warming from exceeding the two-degree ceiling. In the meantime, studies have shown that even if all the pledged cuts were to be fully implemented, the ceiling would still be exceeded.¹²⁴ The pledges of the Accord are, in fact, in line with a temperature rise of more than 3.5 degrees.¹²⁵

- ¹²³ UNFCCC, *Copenhagen Accord*, para. 4. For a compilation of the pledges, see <http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5264.php> (accessed 2 May 2012), and, pursuant to UNFCCC, *Decision 1/CP.16*, para. 36, the revised compilation: Secretariat (UNFCCC), *Compilation of Economy-Wide Emission Reduction Targets to Be Implemented by Parties Included in Annex I to the Convention* (7 June 2011).
- ¹²⁴ International Energy Agency, *World Energy Outlook 2010*, p. 3. See also International Energy Agency, 'Prospect of Limiting the Global Increase in Temperature to 2°C Is Getting Bleaker'. Online. Available HTTP: <http://www.iea.org/index_info.asp?id=1959> (accessed 2 May 2012).
- ¹²⁵ International Energy Agency, *World Energy Outlook 2010*, p. 11. UNEP's 2011 'emission gap' report notes that for a 'likely' chance to keep temperature increase below two degrees Celsius, the maximum global GHG emission level for 2020 is 44 Gt CO₂ eq. However, according to UNEP, even if the Copenhagen Accord's pledges are met in their most ambitious form, global emissions in 2020 will be 50 Gt – an emission gap of 6 Gt per annum by that stage (with an 11 Gt gap for the low-ambition form); UN Environment Programme, *Bridging the Emissions Gap: A UNEP Synthesis Report*, UNEP, 2011, p. 12.

