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of the treaties**

CLIMATE CHANGE: SCIENTIFIC BASIS AND STATUS OF THE NEGOTIATIONS OF THE TREATIES

*Anita Halvorsen and Elisabeth Holland**

I. INTRODUCTION

The Sustainable Companies Project, an international project run by the University of Oslo,¹ is 'dedicated to the development and refinement of efficient tools to realize the significant potential within companies to make independent, creative and active contributions to mitigate climate change.'² Using climate change as a focal point, this project explores how to achieve sustainable companies, defined as companies that seek profit in such a way as to contribute towards the overarching goal of sustainable development, particularly its environmental dimensions. This article provides background for the Sustainable Companies Project on the science of climate change and the international negotiations on climate change.

This interdisciplinary article, written by an atmospheric scientist and an international lawyer, highlights how the science of climate change requires urgent action, yet the international negotiations are not moving fast enough, thus emphasizing the need for sustainable company approaches. The Sustainable Companies Project examines company law in order to find such new approaches that enable companies to play a larger role in addressing climate change.

Currently, the problem of climate change is not being addressed by the international negotiations as an acute problem requiring urgent action to avoid exceeding the 2°C increase in warming as supported by the scientific community. The convincing scientific evidence that climate change is underway, contrasted with the increasing intensity of climate change denialism³ and the weakening of international policy on climate

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¹ Sustainable Companies Project, an international project run by the University of Oslo, available at: <http://www.jus.uio.no/ifp/english/research/projects/sustainable-companies/> (visited January 14, 2012).

² Id.

³ Climate denialism is the denial of the existence of a changing climate argued by those invested in continued GHGs emission for their short term economic advantage. Naomi Oreskes and Erik Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the*

change, argues that we must choose the path of sustainable development across the board, creating business, science, and policies partnerships.

In this article, we first address the science of climate change, including the history and evidence of climate change and the wave of climate denialism that has swept the US, UK, Canada, Australia, and more recently, Europe.⁴ Then we examine the climate change negotiations from Rio (1992) through Durban (2011) and demonstrate the failure of the international negotiations to address the climate change issues in step with the body of scientific knowledge. This failure, in turn, highlights the necessity of considering other approaches to addressing climate change. The Sustainable Companies Project offers one avenue to address climate change issues. The health of the planet and its future generations depends on action at all levels: sub-national, national, regional and international.

II. THE SCIENCE OF CLIMATE CHANGE

A. Background – history

For more than a century, scientists have known that the Earth's climate may be sensitive to changing atmospheric concentrations of greenhouse gases (GHGs).⁵ In 1896, the Swedish scientist Svante Arrhenius published a climate prediction suggesting that changing the atmospheric concentration of carbon dioxide might trigger glacial advances and retreats.⁶ Then, in 1938, G.S. Callendar, an English engineer and inventor, found that a doubling of atmospheric carbon dioxide resulted in an increase in global mean temperature by 2°C (or 3.6 degrees Fahrenheit).⁷ Twenty years later, in 1958, Charles David Keeling, an American scientist, began measuring atmospheric carbon dioxide on the Mauna Loa volcano in Hawaii.⁸ The graph describing the rise in atmospheric carbon dioxide concentrations since 1958 is now iconic in the scientific community.⁹ One of the most

Truth on Issues from Tobacco Smoke to Global Warming, (New York: Bloomsbury Press, 2010) [hereinafter Oreskes]. For an example of climate denialism, see Steve Coll, *Private Empire: ExxonMobil and American Power* (Penguin Press, 2012).

⁴ Pål Prestrud, *Tvilsom klimadebatt* (Doubtful Climate Debate), *Aftenposten*, 20. September 2011, <http://www.aftenposten.no/meninger/kronikker/article4232428.ece#.T53OPqtYs40> (visited April 22, 2012).

⁵ H. Le Treut, R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson & M. Prather, '2007: Historical Overview of Climate Change' in S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor & H. L. Miller (eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007) [hereinafter Le Treut].

⁶ Id.

⁷ Id.

⁸ Id.

⁹ The graph is featured prominently on the wall of the National Academy of Science building in Washington D.C.

memorable moments of the film 'An Inconvenient Truth' occurred when Al Gore boarded the crane to ride to the top of the carbon dioxide curve.¹⁰

In February of 1979, the World Meteorological Organization (WMO) sponsored the First World Climate conference that was convened to focus on the global climate and to discuss climate data, the identification of climate topics, integrated impact studies, and research on climate variability and change.¹¹ The ongoing World Climate Research Program traces its roots back to the 1979 World Climate Conference as does the Intergovernmental Panel on Climate Change (IPCC).¹²

The IPCC was founded in 1988 with the co-sponsorship of the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP).¹³ The IPCC is an inter-governmental body open to all of the member states of the United Nations and the WMO.¹⁴ The IPCC does not conduct research, or monitor the state of the climate or climate parameters,¹⁵ instead, the reports summarize the published scientific literature.¹⁶

The goal of the IPCC, since the appointment of its first chairman, Bert Bolin, a Swedish meteorologist, has been to provide the governments of the world with a synthesis of what was known about the state of the climate science.¹⁷ It has issued assessment reports every five to seven years since the first in 1990.¹⁸ The most recent, the Fourth Assessment Report (AR4), was issued in 2007, and the Fifth Assessment report is due out in 2013.¹⁹ The reports, which have gotten increasingly complex as we understand more and more about the climate and Earth systems, require the input of thousands of scientists to reflect the broad array of opinion and perspectives in the scientific community.

Currently, three working groups participate in the creation of each report. Working Group I is responsible for the physical science basis, Working

¹⁰ *An Inconvenient Truth*, the Academy Award winning documentary film directed by Davis Guggenheim, starring Al Gore, Billy West (2006), Internet Movie Database, available at: <http://www.imdb.com/title/tt0497116/>.

¹¹ World Meteorological Organization, 'First World Climate Conference,' available at: *A History of the Science and Politics of Climate Change: The Role of the Intergovernmental Panel on Climate Change* http://www.wmo.int/pages/themes/climate/international_wcc.php.

¹² The Intergovernmental Panel on Climate Change (IPCC), <http://www.ipcc.ch> (visited December 5, 2011).

¹³ B. Bolin (Cambridge: Cambridge University Press, 2008), p. 49.

¹⁴ Id.

¹⁵ Le Treut, above note 20 at 1.

¹⁶ Id.

¹⁷ Bolin, note 28 above.

¹⁸ Id.

¹⁹ IPCC, Fourth Assessment Report (AR4), (http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml), [hereinafter IPCC AR4].

Group Two is responsible for climate change impacts, adaptations, and vulnerability, and Working Group Three is responsible for examining options for the mitigation of climate change. The regular summaries of the climate science and its impacts provided by the IPCC have been crucial in documenting how the climate has changed and in providing thoughtful scientific input into the global debate about climate change and what to do about it.

B. What is climate change, what is driving it and what is the evidence?

The stunning main conclusion of the most recent scientific assessment of climate change is: 'Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.'²⁰ Rarely in the scientific community can we scientists make such a clear statement, because rarely do we have multiple lines of evidence that lead to a single compelling conclusion.

²⁰ IPCC, '2007: Summary for Policymakers' in S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007), p. 5 [hereinafter IPCC AR4-Working Group I].

Changes in Temperature , Sea Level and Northern Hemisphere Snow Cover

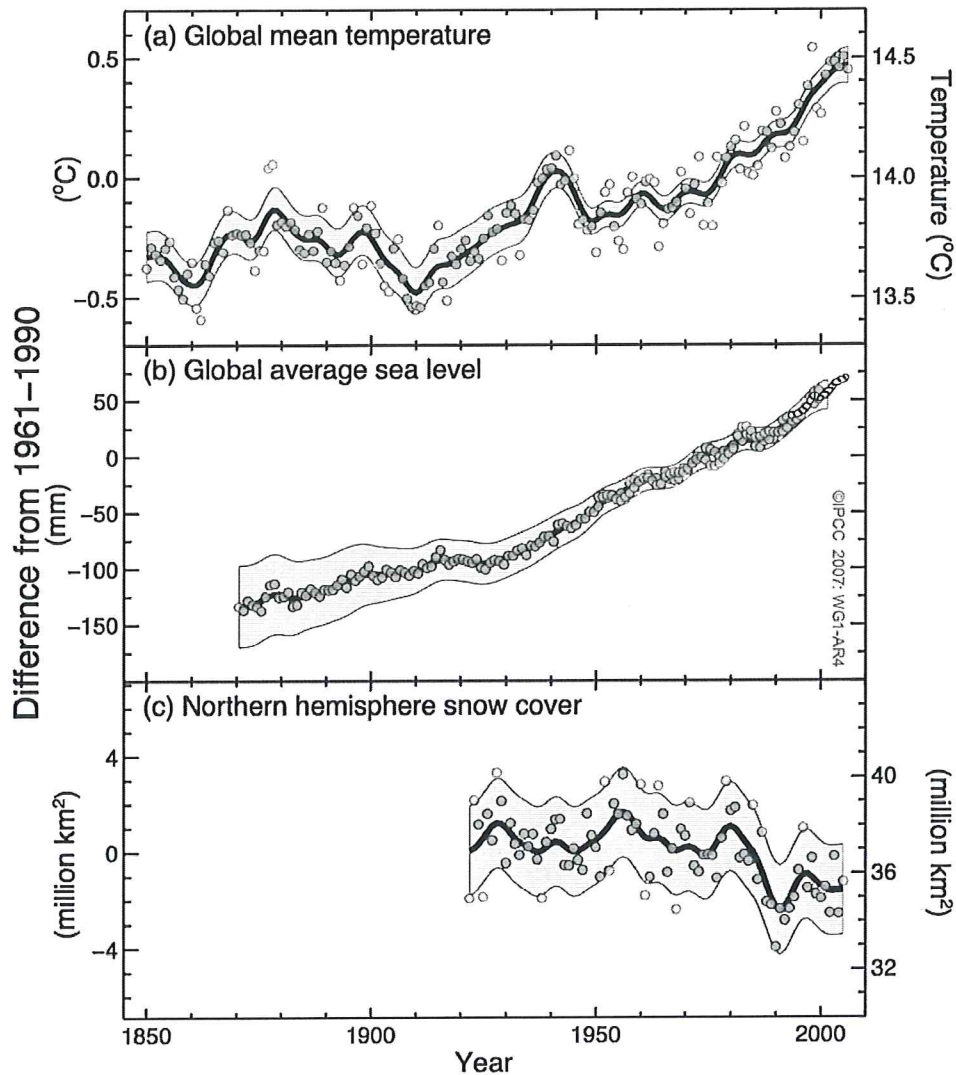


Figure 1. Observed changes in (a) global average surface temperature, (b) global average sea level rise from tide gauges (light grey) and satellite (b/w striped line) data and (c) Northern Hemisphere snow cover for March–April. All changes are relative to corresponding averages for the period 1961–1990. Smoothed curves represent decadal average values while circles show yearly values. The shaded areas are the uncertainty intervals estimated from a comprehensive analysis of known uncertainties (a and b) and from the time series (c).²¹

Our changing climate is driven by rising concentrations of GHGs causing rising global average temperature that has repercussions throughout the climate system including the changing global water cycle with rising sea

²¹ Id. at 6.

level, increasing atmospheric water vapor, and changing precipitation patterns with increasing rainfall in some areas, and decreasing rainfall in other areas; the changing cryosphere²² with changing land and sea ice, and snow cover, and changing weather extremes with changing cyclonic activity: hurricanes, tornadoes and tropical cyclones, and changing atmospheric and ocean circulation patterns.²³ All of these dimensions provide important lines of evidence documenting and supporting climatic change and global warming.²⁴

Important GHGs include carbon dioxide, methane, nitrous oxide, the halocarbons and tropospheric ozone.²⁵ Atmospheric concentrations of carbon dioxide have increased from the pre-industrial level of about 280 ppm to 379 ppm far exceeding the natural range over the last 650,000 years.²⁶ The annual carbon dioxide growth rate was greater between 1995 and 2005 than it had been since the beginning of continuous direct measurements in 1960.²⁷ Fossil fuel combustion, including the production, distribution, and consumption of fossil fuel and a by-product from cement production are increasing.²⁸ The growth rate for carbon dioxide emissions for 2000–2009 was 2.5 per cent, more than twice the growth rate for the 1990 to 2000 time period.²⁹ Developing nations (non-Annex I countries)³⁰ now contribute 57 per cent of the carbon dioxide emissions substantially exceeding the 43 per cent contribution of developed nations (Annex I countries).³¹ Coal is the greatest single source of fossil fuel carbon dioxide emissions, and China and India together contribute 92 per cent of the increase in carbon dioxide emissions from coal.³²

Global atmospheric concentrations of methane increased to 1774 ppb in 2005 from a pre-industrial level of about 715 ppb 'very likely' due

²² 'The cryosphere consists of snow, river and lake ice, sea ice, glaciers and ice caps, ice shelves and ice sheets, and frozen ground', P. Lemke, J. Ren, R.B. Alley, I. Allison, J. Carrasco, G. Flato, Y. Fujii, G. Kaser, P. Mote, R.H. Thomas and T. Zhang, 'Observations: Changes in Snow, Ice and Frozen Ground' in S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007), p. 339.

²³ Id. See also IPCC AR4-Working Group I, above note 21 at 20.

²⁴ Id. at 2.

²⁵ Id. at 4.

²⁶ Id. at 2. 'ppm (parts per million) or ppb (parts per billion, 1 billion = 1,000 million) is the ratio of the number of greenhouse gas molecules to the total number of molecules of dry air. For example, 300 ppm means 300 molecules of a greenhouse gas per million molecules of dry air.'

²⁷ Id.

²⁸ Carbon Budget 2009, Global Climate Project, available at: http://www.globalcarbonproject.org/carbonbudget/09/files/GCP2010_CarbonBudget2009.pdf [hereinafter Carbon Budget].

²⁹ Id.

³⁰ Non-Annex I countries are the developing countries as specified in the UNFCCC, above note 7.

³¹ Carbon Budget, above note 30.

³² Id.

to anthropogenic activities: agriculture and fossil fuel use.³³ Global atmospheric concentrations of nitrous oxide increased to 319 ppb in 2005 from a pre-industrial level of about 270 ppb.³⁴ More than a third of all nitrous oxide emissions are anthropogenic and primarily due to agriculture.³⁵ 'The combined radiative forcing³⁶ due to increases in carbon dioxide, methane and nitrous oxide... is *very likely* to have been unprecedented in more than 100,000 years'.³⁷

The increase in atmospheric GHGs changes the energy balance of the Earth's surface.³⁸ Incoming solar radiation is balanced by reflected solar radiation and outgoing long-wave radiation.³⁹ GHGs 'act as a partial blanket for the long-wave radiation coming from the Earth's surface'.⁴⁰ Thus, warming increases as the atmospheric concentrations of GHGs increase.⁴¹ Continuing our current global greenhouse gas emissions puts us on the path for 800 ppm of carbon dioxide equivalent in the atmosphere with a projected warming of 3.4°C (6.1°F), 4.5 times more warming than we have already experienced. If all greenhouse gas emissions were stopped today, Earth would warm another 0.6°C (1°F), because the greenhouse gasses we emit today will stay in the atmosphere from decades to centuries. The carbon dioxide we emit today will continue to warm the Earth for the next 1000 years.⁴² By choosing our global greenhouse gas emissions, we are choosing the global mean temperature and climate for our children, grandchildren and their descendants.

Scientific research provides evidence to settle compelling scientific questions. In the world of science, before a manuscript is accepted for publication in a scientific journal, the manuscript is critically reviewed by

³³ IPCC AR4, supra note 20 at 3 (referring to "very likely >90 per cent").

³⁴ Id.

³⁵ Id.

³⁶ "Radiative forcing (RF)1 is a concept used for quantitative comparisons of the strength of different human and natural agents in causing climate change." P. Forster, V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland 'Changes in Atmospheric Constituents and in Radiative Forcing' in S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, (Cambridge: Cambridge University Press, 2007), p. 131. (The combined radiative forcing used here is way of expressing the summary impact of 3 GHGs: carbon dioxide, nitrous oxide and methane. See also next paragraph for a more complete discussion of the Earth's energy balance.)

³⁷ Id.

³⁸ See above note 20 at pp. 96–97.

³⁹ Id.

⁴⁰ Id.

⁴¹ Id.

⁴² National Research Council, Committee on Stabilization Targets for Atmospheric Greenhouse Gas Concentrations, *Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia* (Washington D.C.: National Academy of Sciences Press, 2011).

2–5 scientists familiar with the topic to evaluate the scientific case being presented and to provide the editor with an objective evaluation of the manuscript, and whether it deserves publication. In the writing of the IPCC AR4 report, the Working Group I report was reviewed by more than 600 expert reviewers for a total of more than 30,000 review comments to produce a clear consensus of expert opinion.⁴³ Scientific knowledge, as represented in the IPCC reports is the consensus of expert opinion based on the available evidence.⁴⁴

C. Climate change denialism – sowing doubt

Scientists studying climate changes have naively assumed that our job was simply to present the evidence for a changing climate and let the evidence speak for itself. We did not understand or anticipate the resistance or the attacks on the science that have become commonplace. In 2010, science historians Naomi Oreskes and Erik M. Conway published a game-changing book, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*.⁴⁵ In it, they summarize a comprehensive strategy by renowned cold war physicists, Fred Seitz, Fred Singer, Bill Nierenberg, and others to sow doubt about the science to undermine regulation on issues as broad ranging as cigarette smoking, acid rain, the stratospheric ozone hole, and global warming. ‘They understood the power of language: you could undermine your opponents’ claims by insisting that theirs were uncertain, while presenting your own as if they were not,’ summarized Oreskes and Conway⁴⁶.

Oreskes and Conway pointed out that the scientific debate on the health effects of smoking, and second hand smoke ended decades before the continuing public debate was finally resolved by the implementation of anti-smoking regulations in the 1980s.⁴⁷ Similarly, the attacks on the climate change science continue and, in fact, gain intensity, contradicting the body of scientific evidence as it grows stronger and stronger.

Just before the Copenhagen negotiations in November, 2009, climate denialism resulted in the stealing of over a thousand e-mails and more than 3,000 files from the Climate Research Unit at the University of East Anglia.⁴⁸ Based on the e-mails, climate denialists accused the scientific community of fraud, misconduct and a lack of transparency. Investigations

⁴³ S. Solomon, personal communication, 2007.

⁴⁴ *Id.* See also Oreskes, above note 4 at 268.

⁴⁵ *Id.*

⁴⁶ *Id.* at p. 42.

⁴⁷ *Id.* at p. 137, footnote 1.

⁴⁸ J. Eilperin, ‘Hackers steal electronic data from top climate research center,’ *Washington Post*, 21 November 2009.

by committees appointed by the UK House of Commons,⁴⁹ Pennsylvania State University,⁵⁰ and the University of East Anglia⁵¹ cleared climate scientists of these allegations through careful scrutiny of the e-mails and the scientific findings. The profile of the 'manufactured' controversy fits the paradigm of promulgating doubt described in 'Merchants of Doubt' and succeeded in sowing public doubt about the strong scientific consensus on climate change.⁵²

Against the tide of climate denialism, UK economist Nicholas Stern called climate change 'the greatest and widest-ranging market failure ever seen.'⁵³ The men who were the 'Merchants of Doubt' succeeded in their fight against regulation of cigarette smoking, delaying regulations for decades, at the cost of healthier, longer lives for millions of US citizens.

Scientists are now doing their best to counter the disinformation campaigns with accurate representation of climate science. James Hansen, Director of Goddard's Institute for Space Studies and adjunct professor at Columbia University, wrote, 'Storms of My Grandchildren' and maintains a public outreach website.⁵⁴ A group of scientists began Climate Central, whose motto is 'sound science and vibrant media'.⁵⁵ Gavin Schmidt, writes an insightful authoritative blog called 'Real Climate, Climate science from climate scientists.'⁵⁶ These few examples are barely skimming the surface of efforts within the scientific community. Climate denialists from around the world will inevitably continue their resistance to regulation, using delay tactics, and distortions of the science. The cost of delays means that even more stringent cuts in emissions will be necessary to combat the inevitable impacts of climate change.

⁴⁹ UK House of Commons, available at: <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/387/387i.pdf>.

⁵⁰ RA-10 Final Investigation Report Involving Dr. Michael E. Mann, The Pennsylvania State University, 4 June 2010, available at: http://live.psu.edu/pdf/Final_Investigation_Report.pdf.

⁵¹ Sir Muir Russell et al., The Independent Climate Change E-mails Review, July 2010, University of East Anglia, available at: <http://www.cce-review.org/pdf/FINAL%20REPORT.pdf>.

⁵² A. Leiserowitz, E. Maibach, C. Roser-Renouf, N. Smith, and E. Dawson. 'Climategate, Public Opinion, and the Loss of Trust,' (Working Paper, Yale Project on Climate Change Communication, Yale School of Forestry and Environmental Studies, 2 July 2010), available at: http://environment.yale.edu/climate/files/Climategate_Opinion_and_Loss_of_Trust_1.pdf.

⁵³ N. Stern, 'The Stern Review: The Economics of Climate Change,' Executive Summary, I, available at: http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf. Stern was the former chief economist and senior vice President of the World Bank, 2000 to 2003.

⁵⁴ J. Hansen, 'Storms of My Grandchildren', (2009), available at: <http://www.columbia.edu/~jeh1/>.

⁵⁵ Climate Central, available at: <http://www.climatecentral.org/>.

⁵⁶ Real Climate, available at: <http://www.realclimate.org/>.

III. THE CLIMATE CHANGE REGIME AND THE STATUS OF THE NEGOTIATIONS

A. Background

The anthropogenic effect on the climate system, described above in Section II, demands that strong action be taken now to avoid the worst impacts of climate change.⁵⁷ UN Secretary General Ban Ki-Moon recently stated to the UN Security Council that ‘climate change is real’ and that it is a ‘threat to international peace and security.’⁵⁸ The tipping point before the onset of serious environmental impacts due to climate change is no longer decades away.⁵⁹ In spite of the urgency of this timeline, international climate change negotiations have moved at a glacial pace compared to the science of climate change. The barriers to negotiations, for the most part, have been due to the disagreements between nation-states as to what steps need to be taken and how to share the burdens involved in addressing a problem of such magnitude. Some actors on the national and international arena, such as, individuals, industries, business NGOs, and states have, unfortunately, also played a role in deliberately stalling the process or watering down the outcome of the negotiations, mainly due to their interests in continuing ‘business as usual’, especially the use of fossil fuels.⁶⁰

B. Legal principles relevant to climate change

The United Nations Framework Convention on Climate Change (UNFCCC)⁶¹ introduced several principles, among them, sustainable development and common but differentiated responsibilities (CBDR)

⁵⁷ ‘Summary of Conclusions’, in *Stern Review: The Economics of Climate Change*, 2006, available at: http://www.hm-treasury.gov.uk/media/8A8/C1/Summary_of_Conclusions.pdf [hereinafter *Stern Review: Summary of Conclusions*].

⁵⁸ ‘Statement by H.E. Mr. Ban Ki-moon, United Nations Secretary-General, Maintenance of international peace and security, Impact of Climate Change’, Security Council Meeting, 20 July 2011, available at: <http://www.unmultimedia.org/tv/webcast/2011/07/ban-ki-moon-security-council-meeting-part-1.html>.

⁵⁹ See J. Lovell, ‘Interview – The World Has Under Decade to Act on Climate Crisis’, Reuters News Service, 22 Nov. 2006, available at: <http://www.planetark.com/dailynewsstory.cfm/newsid/39096/story.htm>. See also I. Sample, ‘Warming hits ‘tipping point’’, *Guardian*, 11 Aug. 2005, (<http://www.guardian.co.uk/climatechange/story/0,12374,1546824,00.html>), J. Eilperin, ‘Debate on Climate Shifts to Issue of Irreparable Change’, *Washington Post*, 29 Jan. 2006, and R. Boswell, ‘Arctic sea ice melting at near-record pace’, *Postmedia News, Calgary Herald*, 3 August 2011, available at: <http://www.calgaryherald.com/technology/Arctic+melt+ing+near+record+pace/5201178/story.html>.

⁶⁰ See Oreskes and Conway, above note 4 at chapter 6.

⁶¹ The United Nations Framework Convention on Climate Change, New York was adopted in 9 May 1992 and entered into force 21 March 1994, 31 ILM 849, available at: <http://unfccc.int/resource/docs/convkp/conveng.pdf>, [hereinafter UNFCCC].

which are considered core to the climate change negotiations.⁶² The UNFCCC includes these principles in its Preamble as part of its objective and lists them in the operative text in Article 3, but states specifically at the outset of this section that these principles are only to function as guidelines for the Parties to the treaty.⁶³ Bodansky argues that these principles also serve as legal standards, in contrast to legal rules, in the sense that officials must take them into account but that they do not necessitate a particular outcome in the decision-making process.⁶⁴

In its report, 'Our Common Future', the Brundtland Commission defined sustainable development as 'development that meets the needs of the present without compromising the needs of future generations'.⁶⁵ The vision of shared prosperity within the carrying capacity of the Earth's ecosystems is the ultimate goal of sustainable development.⁶⁶ In the context of the climate change regime, the provision highlights both the right to develop and the duty to do so sustainably.⁶⁷

Sustainable development is explained in terms of promoting the integration of three elements – economic development, social development and environmental protection – as interdependent and mutually reinforcing pillars.⁶⁸ Whether one interprets the concept of sustainable development as soft law or a legal principle with normative value,⁶⁹ states which commit to sustainable development through treaties or other international legal instruments have an obligation to balance economic, social and environmental priorities in their development process, in the interest of future generations.⁷⁰

In addition to promoting protection of the environment and integrating it with economic development, sustainable development also addresses the

⁶² International Law Association Committee on the Legal Principles Relating to Climate Change, Draft Conference Report Sofia 2012, <http://www.ila-hq.org/en/committees/index.cfm/cid/1029> [hereinafter Legal Principles].

⁶³ UNFCCC, above note 63 at Art.3.

⁶⁴ D. Bodansky, 'The United Nations Framework Convention on Climate Change: A Commentary' (1993) 8 *Yale Journal of International Law* 501–502.

⁶⁵ Report of the World Commission on Environment and Development, *Our Common Future*, (Oxford: Oxford University Press, 1987), at 8.

⁶⁶ Preparatory Committee for the United Nations Conference on Sustainable Development, First session, 17–19 May 2010, A/CONF.216/PC/2, 1 April 2010, available at: <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N10/302/56/PDF/N1030256.pdf?OpenElement>

⁶⁷ Legal Principles, above note 64 at 19.

⁶⁸ Johannesburg Plan of Implementation, World Summit on Sustainable Development 1 (2002), Chapter 1, available at: http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf.

⁶⁹ Christina Voigt, *Sustainable Development as a Principle of International Law – Resolving Conflicts between Climate Measures and WTO Law* 169 (Martius Nijhoff Publishers, 2009).

⁷⁰ Marie-Claire Cordonier Segger, *Sustainable Development in International Law*, in *Sustainable Development in International and National Law*, Hans Christian Bugge & Christina Voigt (eds.) 182 (Europa Law Publishing, 2008).

needs of present and future generations – called inter-generational equity or fairness between generations – and the needs of the world's poor, called intra-generational equity or fairness within generations.⁷¹ Principle 3(1) of the UNFCCC stipulates:

The Parties should 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. Accordingly, the developed country Parties *should take the lead* in combating climate change and the adverse effects thereof.⁷²

Despite the fact that the CBDR principle, now also referred to as common but differential responsibility and respective capabilities (CBDRRC), is not considered binding international law, it has become a cornerstone of burden-sharing structures adopted in international environmental treaties.⁷³ In the context of climate change, developed countries have historically contributed the most to the climate change problem and have the greater technological and economic capacity to address the problem,⁷⁴ whereas developing countries have not historically had the resources to address the problem. As a result, developed countries should take more responsibility for controlling GHG emissions. The CBDR principle can also be seen as requiring obligations of solidarity assistance in the form of technology transfer and financial assistance.⁷⁵

C. The climate change negotiations

The UNFCCC and its Kyoto Protocol, and the later agreements which will be examined below, are not just focused on the environment. If fully implemented, they will shift the paradigm of economic activity from a fossil-based economy to a low-carbon economy, in part by using market-based mechanisms. This will fundamentally change the basis of production and consumption, transport, investment, and energy sources.⁷⁶ This is also one of the reasons for the delay in negotiating a new

⁷¹ D. Barstow Magraw and L. Hawke, 'Sustainable Development' in D. Bodansky et al. (eds.) *The Oxford Handbook of International Environmental Law*, (Oxford: Oxford University Press, 2007), p. 619.

⁷² UNFCCC, above note 63 at Principle 3(1) (emphasis added).

⁷³ C. Stone, 'Common but Differentiated Responsibilities in International Law' (2004), 98 *American Journal of International Law* 276 at 299. See also L. Rajamani, *Differential Treatment in International Environmental Law* (Oxford: Oxford University Press, 2006), pp.127, 158.

⁷⁴ P. Birnie and A. Boyle, *International Law & the Environment* 101, 2d ed. (Oxford: Oxford University Press, 2002).

⁷⁵ *Id.* at p. 102.

⁷⁶ See A. Cosbey, 'The Kyoto Protocol and the WTO, Seminar Note', The Royal Institute of International Affairs, Energy and Environment Programme, (1998), p. 1, available at: <http://www.iisd.org/pdf/kyoto.pdf>.

agreement; we are discussing a paradigm shift in society which requires a move away from business as usual and toward sustainable development.

The UN Framework Convention on Climate Change

The adoption of the UNFCCC, in 1992, was the beginning of a lengthy, and seemingly, never-ending political process by the international community to deal with the climate change issue through the use of international agreements. The UNFCCC, which sets out the framework for tackling climate change, entered into force in 1994.⁷⁷

The UNFCCC stipulates in Article 2 the objective of the treaty in non-specific terms:

The ultimate objective ... is to achieve ... *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.⁷⁸

The UNFCCC does not stipulate what is the level of 'dangerous anthropogenic interference.' However, Article 3 states that the level needs to be one that does not interfere with food production, allows the ecosystems to adapt naturally to climate change, and needs to enable sustainable economic development. The IPCC in its 4th Assessment Report in 2007 has stipulated that the goal should be to stabilize at 440–500 ppm within the next 20–40 years in order to avoid worsening the situation.⁷⁹ Yet in 1992, when the UNFCCC was adopted, it did not mandate any emission cuts. It only 'urged' Annex I (developed countries) to reduce their GHGs to 1990 levels by 2000 as stipulated in Article 4(2)(a) and (b).⁸⁰ Essentially, the UNFCCC, a binding agreement, introduced a voluntary approach for Annex I states, which were urged to, but not required to reduce their emissions. In other words, none of the Parties to the UNFCCC had any legally binding commitments to reduce their GHG emissions.

⁷⁷ The UNFCCC has near universal participation with 195 Parties as of 2011. See Climate Change Secretariat, 'Status of Ratification' http://unfccc.int/files/essential_background/convention/status_of_ratification/application/pdf/unfccc_ratification_22.11.06.pdf.

⁷⁸ UNFCCC, above note 63 at Art. 2. (Emphasis added).

⁷⁹ IPCC AR4, above note 20.

⁸⁰ UNFCCC, above note 63 at Art. 4(2)(a)–(b). (This followed the framework-protocol approach that was used in the treaties addressing the stratospheric ozone layer, where the policy and institutional framework was set up in the framework convention which was then followed by a protocol specifying the binding reduction commitments.)

The measures used under the UNFCCC were meant to demonstrate that developed states were *taking the lead* in reducing GHG emissions. Non-Annex I Parties (developing countries) were not given such an ‘aim’ to reduce GHGs. Yet, all Parties were required to fulfill binding commitments to report on their national inventory of anthropogenic emissions and measures taken to implement the UNFCCC.⁸¹ Furthermore, all Parties were to communicate the Conference of the Parties detailed reports on their policies and measures according to the schedule in Article 12. This was a binding commitment, focusing on national plans and actions.

In regard to financial and technical assistance, UNFCCC specifies in Article 4(3) that Annex II Parties – the rich, developed countries, excluding those with economies in transition – were to provide the means, the incremental costs, by which the developing countries (non-Annex I Parties) were to fulfill their commitments under Article 12.⁸² The money was to be channeled through a financial mechanism, the Global Environment Facility, first on a temporary basis then permanently.⁸³

Until the objective of the UNFCCC is met, ‘Article 4(2)(d) mandated the Parties to review the adequacy of their commitments based on the evolution of scientific and technological knowledge’ and stipulated that the first review was to take place at the first session of the Conference of the Parties (COP-1) in 1995.⁸⁴ Based on such a review the Convention set up a process for the Parties to amend the treaty. At COP-1, the Parties adopted the Berlin Mandate where they stated that more action needed to be taken to address climate change and reiterated that the developed countries (Annex I Parties) were to ‘take the lead.’ Consistent with the CBDR principle, the developing countries (non-Annex Parties) were not to receive any new commitments under the planned protocol. The result of the process started in Berlin was the adoption of the Kyoto Protocol in 1997.

Kyoto Protocol

The Kyoto Protocol to the UNFCCC, which specified binding emission reduction commitments for only the industrialized countries (Annex I Parties), was adopted unanimously at the third Conference of the Parties (COP-3) in Kyoto, Japan in 1997 and entered into force in 2005.⁸⁵

⁸¹ UNFCCC, above note 63 above at Art.4(1).

⁸² Id. at Art. 4(7).

⁸³ Id. at Art. 11 and 21.

⁸⁴ See also Id. at Art.7(2)(a). (The Conference of the Parties has met annually ever since.)

⁸⁵ Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto, (Japan), 10 Dec. 1997, in force 16 Feb. 2005, available at: http://unfccc.int/essential_background/kyoto_protocol/items/1678.php.

Annex I Parties agreed to Kyoto on the basis of the use of flexible market mechanisms, including the cap-and-trade system that would be utilized in addition to domestic measures in order to reach their targets. The cap-and-trade system meant that Annex I Parties would have to place a 'cap' or limit on their emissions, and to facilitate the implementation of their commitments the parties could trade emission allocations. The idea behind these mechanisms is that the cost of limiting emissions will differ from one region to another, but the benefit for the atmosphere is the same, regardless of where the action is taken.

a. Binding reduction commitments

The Kyoto Protocol was the first treaty addressing the climate change issue by having binding emission reduction targets for Annex I Parties, expressed in terms of assigned amount units (AAUs), similar to pollution permits or allowances. Article 3 of the Protocol sets out that Annex I Parties are required to reduce their GHGs to an average of 5 per cent below their 1990 levels as specified in Annex B of the Protocol in the first commitment period, 2008–12.⁸⁶ The idea is that these commitments were to be made more stringent over time, in accordance with the review process stipulated in Article 3(9) of the Protocol, mandating that further GHG emissions reductions were to be made.⁸⁷ The European Union agreed to lower its emissions by 8 per cent, the U.S. by 7 per cent, Japan by 6 per cent. Some countries such as Russia only needed to freeze their emissions at 1990 levels, and countries such as Australia, Iceland, and Norway could increase their emissions.⁸⁸

A logical interpretation of 'taking the lead' as Annex I Parties were to do as specified in the UNFCCC and the Kyoto Protocol, is that the rest of the Parties, the non-Annex I Parties (developing countries) were to follow, but this was not specifically mandated in the Kyoto Protocol. Under Article 3(9), the Kyoto Protocol allows for additional commitments in the subsequent commitment periods, in other words after 2012. However, it only addresses commitments for Annex I Parties. Article 9 of the Kyoto Protocol, on the other hand, does introduce a more general review in light of the best scientific information to be coordinated with the review provisions in the UNFCCC.⁸⁹ Unless Article 3(9) was amended to include emission reduction commitments for non-Annex I Parties, Article 9 could be the place to introduce such commitments for non-Annex I Parties. Yet none of these avenues were taken, since the international community took a different route with the Bali Action Plan as described below.⁹⁰

⁸⁶ Kyoto Protocol, above note 87 at Art. 3.

⁸⁷ Id. at Art. 9

⁸⁸ Id. at Annex B.

⁸⁹ UNFCCC, above note 63 at Art. 4(2)(d) and Art. 7(2)(a).

⁹⁰ Bali Action Plan, Report of the Conference of the Parties on its thirteenth session, held in Bali from 3 to 15 December 2007, FCCC/CP/2007/6/Add.1, 14 March 2008 (<http://unfccc.int/>)

The new framework led to a non-binding agreement in the form of the Copenhagen Accord in 2009, focusing on bringing the United States into a new treaty which would also commit the non-Annex I Parties to take mitigation actions, based on the UNFCCC, not the Kyoto Protocol.⁹¹

b. Flexible mechanisms in addition to domestic action

At the seventh Conference of the Parties to the UNFCCC (COP-7), in 2001, the Parties adopted the Marrakesh Accords that operationalized the Kyoto Protocol, detailing many of the flexible mechanisms that were only briefly set out in the Protocol.⁹² The Kyoto Protocol introduced three market-based mechanisms to facilitate the implementation of the Annex I Parties' commitments specified in Annex B of the Kyoto Protocol, in effect setting the stage for a cap-and-trade system. The three mechanisms are emissions trading, joint implementation, and the clean development mechanism (CDM), all considered cost-effective ways for Annex I Parties to meet their binding emission reduction commitments. Annex I Parties make use of lower-cost opportunities to reduce emissions, irrespective of the Party in which those opportunities exist. Given that climate change is a global problem, emission reductions made anywhere on the planet would help. In addition, the CDM also promotes sustainable development in developing countries. The three flexible mechanisms give the private sector an incentive to invest in green technology and make a profit by selling emission reduction 'credits' or allowance in a global carbon market that now stands at over \$140 billion.⁹³ The Marrakesh Accords set out the specific methods and procedures to be used in the context of the flexible mechanisms.⁹⁴

Emissions trading is the cornerstone of the innovation introduced with the Kyoto Protocol.⁹⁵ It enables the Annex I Parties (industrialized countries) or the private sector within those Parties to trade allowances with other Annex I Parties.⁹⁶ Annex I Parties acquire units or credits from other Annex I Parties and use them towards meeting their emissions targets under the Kyoto Protocol. If they are able to bring down their own emissions below the commitment level, then Annex I Parties may prepare to sell units when they do not require them for compliance. Annex I Parties are required to

resource/docs/2007/cop13/eng/06a01.pdf#page=3) [hereinafter Bali Action Plan].

⁹¹ See Section E below.

⁹² *Report of the Conference of the Parties on its Seventh Session, Held at Marrakesh from 29 October to 10 November 2001*, U.N. Framework Convention on Climate Change, 7th Sess., 8th plen. Mtg. Addendum, Vol. II, Decision 17/CP.7, at 23, U.N. Doc. FCCC/CP/2001/13/Add.2 (2002), available at <http://unfccc.int/resource/docs/cop7/13a02.pdf> [hereinafter *Marrakesh Accords Vol. II*].

⁹³ N. Linacre et al., *State and Trends of the Carbon Market 2011*, World Bank 9 (2011).

⁹⁴ Marrakesh Accords Vol. II, above note 86 above.

⁹⁵ Sulphur trading has been used in the U.S. since 1990, Acid Rain Program, 42 U.S.C §§ 7651–7651o.

⁹⁶ Kyoto Protocol, note 10 above at Art. 17.

hold a minimum level of units in its national registry to avoid 'overselling' units and subsequently being unable to meet their own emissions targets. In addition, emission trading 'shall be supplemental to domestic actions.'⁹⁷

A system of trading emission credits needs a strictly enforced limit or cap, to make CO₂ credits scarcer, and hence more costly, thereby increasing the incentive for business to cut their emissions. The private sector is already taking advantage of this new marketplace of carbon credits. Businesses have mushroomed in the regulated and voluntary or non-regulated carbon markets. On January 1, 2005, the EU launched the European Union Emission Trading Scheme (ETS), the first international emissions trading mechanism.⁹⁸

The CDM is a very different type of flexible mechanism from emissions trading. It enables Annex I Parties or private entities in the industrialized countries to carry out projects in non-Annex I countries in return for credits they can apply toward their own emission reduction commitments under the Kyoto Protocol.⁹⁹ Once the project is certified, the Annex I Parties are issued Certified Emission Reductions (CERs). The CER projects are also meant to promote sustainable development in the host state, the non-Annex I Party. CDMs started generating CERs starting in the year 2000. This mechanism promotes foreign direct investment (FDI) in developing countries. As with emissions trading and Joint Implementation projects (JI), CDMs are to be supplemental to measures taken domestically in Annex I Party countries.¹⁰⁰ Also the CDM projects, as with JI projects, are to be additional to the GHGs emission reduction that would have occurred without the project.¹⁰¹ Furthermore, 2 per cent of the proceeds from CDM projects is levied to assist developing countries most vulnerable to climate change to meet adaptation costs.¹⁰²

Joint Implementation is structured to enable Annex I Parties to receive credits – emission reduction units (ERUs) – they can use toward their own targets by implementing projects in the territory of another Annex I Party that reduce emissions or increase removals by sinks.¹⁰³ Most projects take place in states with economies in transition where emissions can be cut at lower costs than in the OECD states.¹⁰⁴

⁹⁷ Marrakesh Accords Vol. II above note 86.

⁹⁸ European Union Emission Trading Scheme (ETS), European Commission, Climate Action, available at: http://ec.europa.eu/clima/policies/ets/index_en.htm

⁹⁹ Id. at Art. 12.

¹⁰⁰ Id. at Art. 12(2)(b) – "... part of their quantified emission limitation and reduction commitments..."

¹⁰¹ Id. at Art. 12(5)(c).

¹⁰² Id. at Art. 12(8).

¹⁰³ Id. at Art. 6.

¹⁰⁴ Organization for Economic Cooperation and Development (OECD). These states are considered the "richer" industrialized states.

In 2004, after Russia received assurances from the EU that it would help Russia with its admission into the WTO, Russia ratified the Kyoto Protocol.¹⁰⁵ This enabled the Kyoto Protocol to finally enter into force in 2005.¹⁰⁶ The international community met in Montreal at the end of 2005 for its eleventh Conference of the Parties (COP-11). It was also the first Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP/MOP-1 or CMP-1). At CMP-1, the Parties agreed to establish the Ad Hoc Working Group on Further Commitments for Annex I Parties (AWGKP), a subsidiary body under the Kyoto Protocol, to consider emission reductions for the next commitment period, after 2012 in accordance with Article 3(9) of the Kyoto Protocol. In addition, COP-11 agreed to start a series of 'dialogues' to consider long-term cooperation under the UNFCCC 'without prejudice to any future negotiations, commitments, process, framework or mandate under the Convention.'¹⁰⁷ This was in response to the lack of binding commitments for developing countries and the need for the US to agree to binding emission cuts.¹⁰⁸

Bali Action Plan

The Bali Road Map adopted by the Parties to the 13th Conference of the UNFCCC, COP-13, in 2007, set the stage for *all* the emitters of GHGs to reach a new agreement by 2009. The Bali Roadmap established two tracks for negotiating what to do after the first commitment period of the Kyoto Protocol runs out in 2012. One track, set out in the Bali Action Plan, was represented by the Ad Hoc Working Group on Long-term Cooperative Action (AWGLCA).¹⁰⁹ The AWGLCA, established as a subsidiary body under the UNFCCC, was mandated to consider long-term cooperation under the UNFCCC.¹¹⁰ The mandate includes four building blocks: mitigation, adaptation, technology transfer, and financial resources.¹¹¹

The second track dealt with the negotiations under Kyoto by the Ad Hoc Working Group on the Kyoto Protocol (AWG-KP). Tensions were high during the final day of negotiations when the delegate from Papua New Guinea asked the U.S. delegation to 'get out of the way' if it was not going

¹⁰⁵ C. Digges, Putin signals Russia will sign Kyoto Protocol for WTO membership, *Bellona*, 23 May 2004, (http://www.bellona.org/english_import_area/energy/34179).

¹⁰⁶ See Kyoto Protocol, above note 8 at Art. 25.

¹⁰⁷ UNFCCC, 'Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention', (<http://unfccc.int/meetings/dialogue/items/3668.php>).

¹⁰⁸ The United States never ratified the Kyoto Protocol and under the Bush Administration, the U.S. rejected the Kyoto Protocol in 2001.

¹⁰⁹ Bali Action Plan, above note 92.

¹¹⁰ *Id.*

¹¹¹ *Id.* at Art. 1(b), (c), (d), and (e). Bali Roadmap, Address to Closing Plenary by His Excellency Mr. Rachmat Witoelar, President, UN Climate Change Conference Closing of Joint High-Level Segment Bali, 15 December 2007, (http://unfccc.int/files/meetings/cop_13/application/pdf/close_stat_cop13_president.pdf).

to lead the way.¹¹² In the eleventh hour, the U.S. delegation decided to be more flexible and joined the consensus that allowed for the adoption of the Bali Action Plan.¹¹³

The AWGLCA was to carry out a comprehensive process to enable the implementation of the UNFCCC through long-term action starting in 2008 and going beyond 2012.¹¹⁴ It was meant to produce an agreement that could be adopted at the 15th meeting of the Conference of the Parties (COP-15) in 2009, in Copenhagen.¹¹⁵

The AWGLCA had a mandate to come up with a long-term *global* goal for emission reductions.¹¹⁶ The UNFCCC, however, has no specific numbers defining what constituted 'dangerous interference with the climate system'. In its 4th Assessment Report (AR4), the IPCC stipulated that global emissions need to peak in 10–15 years and that emissions need to decline by 50 per cent by 2050 in the most stringent IPCC stabilization category (below 490 ppm CO₂-equivalent).¹¹⁷ Furthermore, Annex I Parties would need to reduce their emissions significantly by 2020 (10–40 per cent).¹¹⁸ Yet, these numbers were not, however, spelled out in the Bali Action Plan due to opposition from the U.S., Canada, Russia, and Japan. These states did not want to prejudge the outcome of the process.¹¹⁹ The Plan made a reference to the AR4 of the IPCC, but only stated that 'deep cuts' in global emissions will be needed to achieve the ultimate objective of the Convention.¹²⁰

In regards to mitigation, AWGLCA was to consider mitigation commitments or actions including quantified emission limitations and reduction objectives by all developed country Parties (including

¹¹² Earth Negotiations Bulletin (ENB), Summary, Summary of the Thirteenth Conference of Parties to the UN Framework Convention on Climate Change and Third Meeting of Parties to the Kyoto Protocol:

3–15 December 2007, Volume 12, No.354, at 16, (<http://www.iisd.ca/download/pdf/enb12354e.pdf>).

¹¹³ *Id.* at 20.

¹¹⁴ Bali Action Plan, above note 92 at Art. 1.

¹¹⁵ *Id.*

¹¹⁶ *Id.* at Art. 1(a).

¹¹⁷ Working Group III, IPCC AR4, B. Fisher, et al., '2007: Issues related to mitigation in the long term context' in B. Metz et al. (eds.) *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007), (<http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter3.pdf>).

¹¹⁸ *Id.* at p. 90 (Technical Summary), T. Barker et al., '2007: Technical Summary' in B. Metz et al. (eds.) *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007), available at: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-ts.pdf>.

¹¹⁹ ENB, note 120 at p. 15.

¹²⁰ Bali Action Plan, above note 92 at preamble.

the U.S.).¹²¹ Developing countries were to have nationally appropriate mitigation actions (NAMAs) in the context of sustainable development, supported and enabled by technology, financing, and capacity-building. The NAMAs must be conducted in a measurable, reportable, and verifiable manner.¹²² Policy approaches related to reducing emissions from deforestation and forest degradation were also to be considered.¹²³ In regards to mitigation, the AWGLCA, in addition, was to consider cooperative sectoral approaches and the use of markets.¹²⁴

The Bali Action Plan called for international cooperation to support urgent implementation of adaptation action using vulnerability assessments, financial needs assessments, and capacity-building and response strategies, among others.¹²⁵ Risk management was promoted as well as insurance to transfer risks.¹²⁶ Furthermore, economic diversification was emphasized to build resilience.¹²⁷ With regard to technology transfer, the AWGLCA was to consider means for removal of obstacles and provision of incentives to scale-up the development and transfer of technology to developing countries, thus promoting access to affordable environmentally sound technology.¹²⁸ Enhanced action on the provision of financial resources would be based on consideration of improved access to adequate, predictable and sustainable financial resources for developing countries, including new and additional resources and mobilization of private sector funding and investment.¹²⁹

Copenhagen Accord

Rather than adopting a new binding agreement in Copenhagen, in 2009, as had been the goal under the Bali Action Plan, the Parties to the UNFCCC at COP-15 only took 'note of' the Copenhagen Accord,¹³⁰ a non-legally binding, political agreement which allowed Annex I states (industrialized countries) and non-Annex I states (developing countries) to pledge voluntary mitigation commitments or actions, respectively. This

¹²¹ Id. at Art. 1(b)(i).

¹²² Id. at Art. 1(b)(ii).

¹²³ Id. at Art. 1(b)(iii).

¹²⁴ Id. at Art. 1(b)(iv)(v).

¹²⁵ Id. at Art. 1(c)(i).

¹²⁶ Bali Action Plan, *supra* note 92 at Art. 1(c)(ii).

¹²⁷ Id. at Art. 1(c)(iv).

¹²⁸ Id. at Art. 1(d)(i).

¹²⁹ Id. at Art. 1(e)(i)(v).

¹³⁰ Copenhagen Accord, in UNFCCC, Decision 2/CP.15, Report of the Conference of the Parties on Its Fifteenth Session, Copenhagen, 18 Dec. 2009, FCCC/CP/2009/L.7, 30 March 2010, <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=3>, [hereinafter Copenhagen Accord].

Accord had been negotiated initially by a handful of countries outside the UNFCCC process, the night before the last day of the conference.¹³¹

COP-15 had a mixed outcome with some breakthroughs, yet on the whole COP-15 was considered a fiasco. In spite of this setback, as one observer noted, 'without Copenhagen, we would not have had Cancun', and now Durban.¹³² The goal of adopting a new international agreement on climate change to enter into force when the Kyoto Protocol's first commitment period came to an end in 2012 was not reached because the nearly 120 heads of government at COP-15 were not able to reach consensus. No new *binding* commitments were agreed to, no long-term commitments, such as a 50–80 per cent reduction in GHGs by 2050, were even mentioned, and no specific target was given for when global emissions need to peak. Yet, the Copenhagen Accord, a three page *political* document, was as UN Secretary-General Ban Ki-moon said, '...an essential beginning'.¹³³

The Copenhagen Accord constitutes a framework to address climate change following up on the Bali Action Plan. The break-through was the introduction of a process whereby *all* major emitters of GHGs are to be involved in mitigating climate change. The UNFCCC and Kyoto Protocol had not done this, though it was contemplated in both treaties when the agreements stated that industrialized countries are to '*take the lead*', implying that the developing countries were to follow. For industrialized countries including the U.S., the Copenhagen Accord meant they would have to agree to emission reduction commitments and for developing countries, especially India and China, it meant they would have to agree to mitigation actions.

Under the Copenhagen Accord, developed countries did not commit themselves to the top-down model of internationally negotiated targets at they did under the Kyoto Protocol, but utilized a bottom-up approach, a 'pledge and review' approach, whereby they defined their own commitments and actions unilaterally and then submitted their pledges to the UNFCCC Secretariat.¹³⁴ The developing countries used the same process for submitting their mitigation actions.

¹³¹ D. Bodansky, 'The Copenhagen Climate Change Conference: A Post-Mortem' (2010) *American Journal of International Law* 104 at 231, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1553167.

¹³² Personal communication with Daniel Bodansky at American Society of International Law, annual meeting, Washington D.C., 24 March 2011.

¹³³ Copenhagen United Nations Climate Change Conference ends with political agreement to cap temperature rise, reduce emissions and raise finance, Press Release, UNCCC Secretariat, (http://unfccc.int/files/press/news_room/press_releases_and_advisories/application/pdf/pr_cop15_20091219.pdf).

¹³⁴ Daniel Bodansky, 'A Tale of Two Architectures: The Once and Future U.N. Climate Change Regime,' 7 March 2011, (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1773865).

One hundred and forty-one countries agreed to be associated with the Copenhagen Accord, including all of the world's major emitters.¹³⁵ Eighty-six countries made *pledges* of mitigation by 2020, in accordance with paragraph four or five of the Copenhagen Accord depending on if they were an Annex I or non-Annex I Party.¹³⁶ Some of the pledges are as follows: the US pledged to reduce GHG emissions by 17 per cent from 2005 levels (4 per cent from 1990 levels), the EU pledged a 20 per cent reduction in GHGs from 1990 levels (30 per cent if other developed countries pledge to comparable cuts), Russia pledged to a 15–25 per cent in cuts,¹³⁷ China pledged to lower its carbon intensity (carbon dioxide emissions per unit of GDP) by 40–45 per cent from 2005 levels, India pledged to a reduction of 20–25 per cent from 2005 levels of carbon intensity, and Brazil pledged to a 36.1–38.9 per cent reduction below projected emissions by 2020.¹³⁸

After much debate, developing countries agreed to their mitigation actions being subjected to international measurement, reporting and verification (MRV) if the actions were supported by international finance.¹³⁹ Mitigation actions with no international support would be subject to domestic MRV with provisions for international consultations and analysis ensuring that national sovereignty is respected.¹⁴⁰

With the Copenhagen Accord, for the first time a target for the global average temperature rise – set at less than 2°C – was specified in an international agreement, even if it was only politically binding.¹⁴¹ This was based on the IPCC stipulations as to what the maximum increase should be in regards to temperature in order for the UNFCCC's objective to be reached. However, the aggregate of developed country emissions voluntary pledges set out in Annex I of the Copenhagen Accord, totaling 13–19 per cent below 1990 levels, *falls short* of goal of 25–40 per cent below the 1990 level by 2020, determined as the lowest stabilization scenario in the IPCC 4th Assessment report.¹⁴² This introduced a serious problem with the pledge and review approach; it will not be sufficient to reach the

¹³⁵ UNFCCC Secretariat's website for the Copenhagen Accord, stipulating states associated with the Copenhagen Accord and their national pledges, available at: http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5262.php.

¹³⁶ *Id.*

¹³⁷ Copenhagen Accord, above note 132 at Appendix I - Quantified economy-wide emissions targets for 2020, available at: http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5264.php.

¹³⁸ *Id.* at Appendix II – Nationally appropriate mitigation actions of developing country Parties, available at: http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5265.php.

¹³⁹ Copenhagen Accord, *supra* note 132 at para. 5.

¹⁴⁰ *Id.*

¹⁴¹ *Id.* at para. 1.

¹⁴² N. Stern and C. Taylor, United Nations Environment Programme, 'What do the Appendices to the Copenhagen Accord tell us about global greenhouse gas emissions and the prospects for avoiding a rise

in global average temperature of more than 2°C?' Policy Paper, Centre for Climate Change Economics and Policy, March 2010, (<http://www.environmentportal.in/files/>

UNFCCC goal which is 'to stabiliz[e] the greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system.'¹⁴³

The Copenhagen Accord was also the first time a specific dollar amount was specified to facilitate climate change mitigation and adaptation efforts by developing countries. Short-term financing for the 2010–2012 period was set 'at approximately' USD 30 billion and with a goal of mobilizing USD 100 billion per year by 2020.¹⁴⁴

Two new bodies and two mechanisms were agreed to at Copenhagen. The Copenhagen Green Climate Fund and a High Level Panel on financing were established.¹⁴⁵ The latter was set up to study potential sources of revenue. In addition, the need to reduce emissions from deforestation and forest degradation and to enhance removals of GHG emissions by forests, and the use of positive incentives was recognized and agreed to in the Copenhagen Accord. The process was entitled the REDD mechanism – Reduction from Deforestation and Forest Degradation.¹⁴⁶ The framework for this mechanism was set out in a separate decision of COP-15.¹⁴⁷ The second mechanism, the Technology Mechanism, is aimed at accelerating technology development and transfer in order to support mitigation action and adaptation by developing countries.¹⁴⁸

The outcome of the AWG-KP negotiating track was not nearly as ambitious: Annex I Parties did not agree to new targets. However, some decision were taken, such as on Further Guidance on CDMs on land use, land use change, and forestry activities (LULUCF).¹⁴⁹

Cancun Agreements

A year after Copenhagen, in Cancun, at COP-16, although the Cancun Agreements were adopted as a COP decision, they still did not constitute a legally binding agreement. The Cancun Agreements, however, did bring the Copenhagen Accord into the UNFCCC process, integrating

Accord_targets_paper.pdf). See also J. Rogelj et al., 'Copenhagen Pledges are Paltry' (22 Apr. 2010) 464 *Nature* 1126–1128.

¹⁴³ UNFCCC, above note 63 at Art. 2.

¹⁴⁴ Copenhagen Accord, above note 132 at para. 8.

¹⁴⁵ *Id.* at para. 9.

¹⁴⁶ Methodological guidance for activities relating to reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries, Report of COP-15, Decision 4/CP.15, (<http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf>).

¹⁴⁷ *Id.*

¹⁴⁸ Copenhagen Accord, above note 132 above at para. 11.

¹⁴⁹ Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its Fifth Session (CMP-5), held in Copenhagen, 7–19 December 2009, FCCC/KP/CMP/2009/21, 30 March 2010, (<http://unfccc.int/resource/docs/2009/cmp5/eng/21.pdf>).

the mitigation commitments or actions by all major emitters to address climate change that had been submitted under the Copenhagen Accord.

The pledges made under the Copenhagen Accord by nearly all the Parties to the UNFCCC, to mitigate their GHG emissions or take mitigation actions, were formalized and operationalized in the Cancun Agreements, through a COP decision, and represent the largest collective effort to address climate change.¹⁵⁰ Cancun brought legitimacy back to the UN negotiation process, making it once again the main focus for the international community in its effort to address climate change. On the other hand, the decision adopted in Cancun in the face of Bolivia's objection represents a stretch of the consensus rule used under all COP negotiations.¹⁵¹

The Cancun Agreements set out the 'shared vision' for long-term cooperative action to address climate change through UNFCCC's objective, based on equity and in accordance with the CBDR principle.¹⁵² In a comprehensive manner, the vision includes the elements of the Bali Action Plan by focusing on mitigation, adaptation, finance, technology development and transfer, and capacity-building in order to implement the UNFCCC.¹⁵³ Adaptation to climate change is now given the same priority as mitigation, and financial resources committed under the Copenhagen Accords are strengthened with the establishment of the Green Climate Fund.¹⁵⁴

The goal of holding temperature increases to less than 2°C above preindustrial levels, stipulated in the Copenhagen Accord, was reinforced by setting out an explicit time table for reviewing its adequacy in light of the best available scientific knowledge.¹⁵⁵ The Cancun Agreement, recognizing the concerns of the small island developing countries, also considered a strengthening of the long-term goal in relation to a temperature rise of 1.5°C.¹⁵⁶ This review also included an assessment of

¹⁵⁰ Yet the Cancun Agreements only took note of the pledges: "Takes note of quantified economy-wide emission reduction targets implemented by Parties included in Annex I to the Convention..." "Takes note of nationally appropriate mitigation actions to be implemented by Parties not included in Annex I..." Report of the Conference of the Parties on its sixteenth session (COP-16), held in Cancun from 29 November to 10 December 2010, Decision 1/CP.16, paras. 36 and 49, respectively, FCCC/CP/2010/7/Add.1 [hereinafter Cancun Agreements].

¹⁵¹ The Conference of the Parties function with a set of draft Rules of Procedure without voting rules, under a general agreement that decisions are adopted by consensus. Consensus in this context is generally viewed as agreement without any objections. A. Vihma, 'A Climate of Consensus the UNFCCC Faces Challenges of Legitimacy and Effectiveness', FIIA Briefing Paper 75, March 2011.

¹⁵² Cancun Agreements, above note 152 at para. 1.

¹⁵³ *Id.*

¹⁵⁴ *Id.* at pp. 95 and 102.

¹⁵⁵ *Id.* at para.138.

¹⁵⁶ Cancun Agreements, above note 152 at para. 139(a)(iv).

the overall aggregated effect of the mitigation steps taken by the Parties in order to achieve the ultimate objective of the UNFCCC.¹⁵⁷ The important issue is whether this review process will be effective enough to fulfill the goal of *actually* holding temperature increases at *less* than 2°C above preindustrial levels when the pledges at this state surpass the goal.

The Cancun Agreements also established the Cancun Adaptation Framework¹⁵⁸ and Adaptation Committee to enable the implementation of enhanced action on adaptation under the UNFCCC. The Cancun Adaptation Committee will promote the implementation of enhanced action on adaptation through functions such as: technical support, sharing of relevant information and good practices, and by promoting synergy and strengthened engagement with national, regional and international organizations.¹⁵⁹ COP-16 also established a Technology Mechanism to consist of a Technology Executive Committee and a Climate Technology Centre and Network in order to support action on mitigations and adaptation in developing countries.¹⁶⁰ The Technology Mechanism is to become fully operational in 2012.¹⁶¹

Furthermore, the Cancun Agreements also established a Green Climate Fund to be accountable and function under the guidance of the Conference of the Parties,¹⁶² and to be governed by a board of 24 members.¹⁶³ The World Bank was invited to serve as the interim trustee for three years after the operationalization of the Fund.¹⁶⁴ This Fund and its effective operationalization will be fundamental to the question of whether the developing countries, especially the fast growing ones, are willing and able to implement their pledges.

Durban Agreements – roadmap for a new treaty

With the first commitment period of the Kyoto Protocol expiring in 2012, there was significant pressure on the parties to adopt a COP decision in December 2011, at COP-17 in Durban, South Africa, setting out a formal mandate for the conclusion of a new treaty or protocol. However, the parties only agreed to a roadmap for action, launching a new process to negotiate a new comprehensive climate agreement, 'a protocol, another legal instrument or an agreed outcome with legal force'.¹⁶⁵ The new Ad

¹⁵⁷ Id. at para. 139(a)(iii).

¹⁵⁸ Id. at para. 13.

¹⁵⁹ Id. at para. 20.

¹⁶⁰ Cancun Agreements, above note 152 at p. 117.

¹⁶¹ Id. at p. 128.

¹⁶² Id. at para. 102.

¹⁶³ Id. at p. 103.

¹⁶⁴ Id. at p. 107.

¹⁶⁵ Establishment of an Ad Hoc Group on the Durban Platform for Enhanced Action, UNFCCC Decision 1/CP.17, Dec. 11, 2011, available at: <http://unfccc.int/files/meetings/>

Hoc Working Group on the Durban Platform for Enhanced Action is to begin work this year and the Parties are to adopt a new agreement by 2015 which is to enter into force by 2020.¹⁶⁶ Since the pledges from Copenhagen, reconfirmed at Cancun, will not reach the goal of staying below a 2°C increase in temperature, this new process is supposed to raise the level of ambition and there are supposed to be workshops addressing the issue in 2012.¹⁶⁷

The EU was able to create a ‘green coalition’ with the most vulnerable countries and two of the BASIC countries, Brazil and South Africa.¹⁶⁸ In return for the EU agreeing to a second commitment period for the Kyoto Protocol, India, China, and the US agreed to a roadmap for a new binding agreement. However, the problem with this agreement is that contrary to common belief, having a legally binding agreement does not mean that the agreement will include binding emission reduction commitments, just as the UNFCCC contained only an ‘urging’ or a voluntary target and timetable for developed countries to reduce their emissions.¹⁶⁹

D. Outlook for the future

The international agreements have evolved from a voluntary approach with regard to GHG emission reductions within the legally binding UNFCCC to a binding commitment and timetable approach in the Kyoto Protocol and then returned to a voluntary approach, now in the form of a ‘pledge and review’ approach in the non-legally binding Copenhagen Accord, confirmed in the Cancun Agreements. Much of the language has also changed from obligatory language to just being aspirational.¹⁷⁰ The question arises whether the pledge and review approach is too weak an approach, hampering us from reaching the goal of the UNFCCC.

In order to achieve the goal of holding temperature increases *below* 2°C above preindustrial levels according to the IPCC’s 4th Assessment Report, the Cancun Agreements’ AWG-KP Outcome Report, addressing the Kyoto Protocol, requires ‘Annex I Parties as a group to reduce emissions in a range of 25–40 per cent below 1990 levels by 2020.’¹⁷¹ However, the voluntary pledges made on mitigation targets or actions submitted by

durban_nov_2011/decisions/application/pdf/cop17_durbanplatform.pdf, Durban, above note 11 at para. 2 [hereinafter Durban Platform].

¹⁶⁶ Id. at para. 2.

¹⁶⁷ W. Sterk et al., ‘On the Road Again, Progressive Countries Score a Realpolitik Victory in Durban While the Real Climate Continues to Heat Up’, Wuppertal Institut, 19 December 2011, (<http://dw.crackmypdf.com/0268566001326129310/On%20the%20Road%20Again-COP17-report.pdf>).

¹⁶⁸ Id. at 31. BASIC countries include Brazil, South Africa, India, and China.

¹⁶⁹ Id.

¹⁷⁰ Rajamani, note 75 above.

¹⁷¹ Cancun Agreements, above note 152 at AWGKP Outcome Report, para.6.

over eighty states – instead of reducing the level of GHGs – actually *increase* them by 10–20 per cent by 2020.¹⁷² All the work that has been done thus far to get everyone to commit to act to address climate change will be for naught if we do not reach the objective of UNFCCC.

The pledge and review approach allows the states to set their pledges unilaterally.¹⁷³ This represents a move away from the collective need of our planet as a whole, with reciprocal obligations on an international level, and instead allows each state's interests to take precedence. Hunter has criticized this approach as 'devaluing the role of international law and global climate governance'.¹⁷⁴ He states that without the binding commitments of the Kyoto approach, *no* Parties have binding commitments and the environment is the clear loser.¹⁷⁵ However, many scholars claim that progress is being made if one looks at the UNFCCC process as a step-by-step process, rather than as a single, overarching agreement.¹⁷⁶ With the Cancun Agreements, we now have a substantive agreement which includes mitigation commitments and actions for *all* the big GHG emitters and which also urges the developed country Parties to increase their reduction targets to a level consistent with the IPCC's 4th Assessment Report. Furthermore, it includes a review process as mentioned above, to begin in 2013.¹⁷⁷

The Durban Agreements give us a glimmer of hope by representing a move back toward the binding emission reduction commitments of Kyoto. However, even if the Durban roadmap calls for 'a protocol, another legal instrument or an agreed outcome with legal force', that language does not guarantee the pledges taken note of at Cancun would be translated into *binding* commitments.

¹⁷² J. Rogelj, M. Meinshausen, et al., 'Copenhagen Accord pledges are paltry', (22 April 2010) *Nature*, Vol. 464, available at: http://www.ecoequity.org/wp-content/uploads/2010/08/Copenhagen_Accord_Pledges_are_Paltry.pdf. (The report was made in the context of the pledges made in conjunction with the Copenhagen Accords, which, in turn, were brought into the UNFCCC process by the Cancun Agreements, above note 152 which specify that COP-16 "Takes note of quantified economy-wide emission reduction targets implemented by Parties included in Annex I to the Convention". See also the Durban Platform, above note 167. (The Durban decision recognizes the significant gap between the aggregate effect of mitigation pledges and aggregate emissions pathways needed to hold the increase in global average temperatures below 2°C above pre-industrial levels).

¹⁷³ D. Hunter, 'Climate Law Reporter: Implications of the Copenhagen Accord for Global Climate Governance' (2010)10 *Sustainable Development Law and Policy* 4. (Hunter is referring to the Copenhagen Accord, but the same approach applies to the Cancun Agreements.)

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

¹⁷⁶ R. Stavins, 'Why Cancun Trumped Copenhagen: Warmer Relations on Rising Temperatures' *Christian Science Monitor*, 20 December 2010, available at: <http://www.csmonitor.com/Commentary/Opinion/2010/1220/Why-Cancun-trumped-Copenhagen-Warmer-relations-on-rising-temperatures>.

¹⁷⁷ Cancun Agreements, above note 152 at para.139(b).

The expectations of Kyoto have not been fulfilled because the US rejected Kyoto, moving away from its commitment to *take the lead* as stipulated in the UNFCCC and the Kyoto Protocol, and hence many developing countries did not feel compelled to take action to mitigate climate change. In addition, the fast growing developing countries have overtaken several developed countries in their emissions, making it more urgent for them also to address climate change through binding commitments. Yet, the fact that the industrialized countries are responsible for the historic GHG emissions has not changed. Industrialized countries have to subsidize, to a large extent, the mitigation action taken by the developing countries. The Green Climate Fund, if implemented properly will provide the needed funding.

In international law, reciprocal responsibility is part of the incentive scheme to address a global issue. The Bali Action Plan set the stage, but now we must move to a binding agreement with binding mitigation commitments and actions, not voluntary or 'soft law' pledges in order for the international community to reach the goal of the UNFCCC in time. Several developed countries have called for equitable participation of all countries under the new agreement, expressed in terms of 'legal symmetry.'¹⁷⁸ Under the new agreement, the developing countries would continue to have differential treatment or 'asymmetrical responsibilities' in the sense that they would have mitigation action and not emission reductions at the outset, yet, they would need to prepare to take on emission reductions in the near future if we are to reach the UNFCCC goal. Stronger measures are already being called for as a result of the science summarized in the IPCC reports if we are to avoid devastating environmental impacts.¹⁷⁹ However, these emissions reductions would need to be lower than the targets set for the industrialized countries, so that developing countries could still develop, yet in a sustainable manner. The demands put on developing countries would need to be contingent on the receipt of funding from industrialized countries. If more action is expected, then more funding has to be forthcoming. There should be a clear differentiation also within the developing countries as a group, between fast-growing developing countries and the developing countries whose economies have not grown so fast.

¹⁷⁸ J. Werksman and K. Herbertson, 'The Aftermath of Copenhagen: Does International Law have a Role to Play in a Global Response to Climate Change?' (2010) 25 *Maryland Journal of International Law* 111. (The authors distinguish between an agreement having the same legal character, 'legal symmetry' and differentiation between the level of effort required within such an agreement, stating that developed countries have accepted such a differentiation.)

¹⁷⁹ IPCC AR4, above note 20. See also IPCC, 'Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Summary for Policymakers', 2011, available at: http://ipcc-wg2.gov/SREX/images/uploads/SREX-SPM_Approved-HiRes_opt.pdf.

By only including voluntary commitments, the pledge and review system has no enforcement mechanism and no binding consequences for non-compliance. The question of non-compliance is one of the most important in the context of a new post-Kyoto binding agreement. When the stakes are as high as in the case of climate change, especially with regard to the impacts we are already seeing on a global scale, for Parties not to fulfill their pledges would in the long term lead to global catastrophe. Hence, the pledges need to be translated into binding commitments by 2015.

Jacobs has suggested that the Parties' commitments for 2015 should be strengthened at a summit of heads of government as early as 2015 to close the ambition gap between the pledges and the goal of limiting global warming to the 2°C above preindustrial levels.¹⁸⁰ He posits that we need to use both 'top-down', and 'bottom-up', approaches through international diplomacy and national policy, respectively.¹⁸¹ These are not mutually exclusive approaches, but interdependent.¹⁸² Agreement at the international level is limited to attainable domestic policy in the major economies, but international pressure helps to decide the level of national ambition, as was the case in Copenhagen in 2009.¹⁸³

IV. CONCLUSION

At present, climate change is not being addressed by the international negotiations as an acute problem requiring urgent action to avoid exceeding the 2°C increase in warming as supported by the scientific community. In this article we first addressed the science of climate change, including the history and evidence of climate change and the wave of climate denialism. Then we examined the climate change negotiations from Rio through Durban, demonstrating the failure of the negotiations to address climate change, which contradicts the strong body of scientific evidence that 'warming is unequivocal' and that global changes already underway are pervasive. Therefore, this article highlights the necessity of considering other approaches to address climate change. The Sustainable Companies Project offers an important avenue to reach this goal.

¹⁸⁰ M. Jacobs, 'Deadline 2015, Comment' Vol. 481, *Nature*, 12 January 2012, pp. 137–138.

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ *Id.*

