

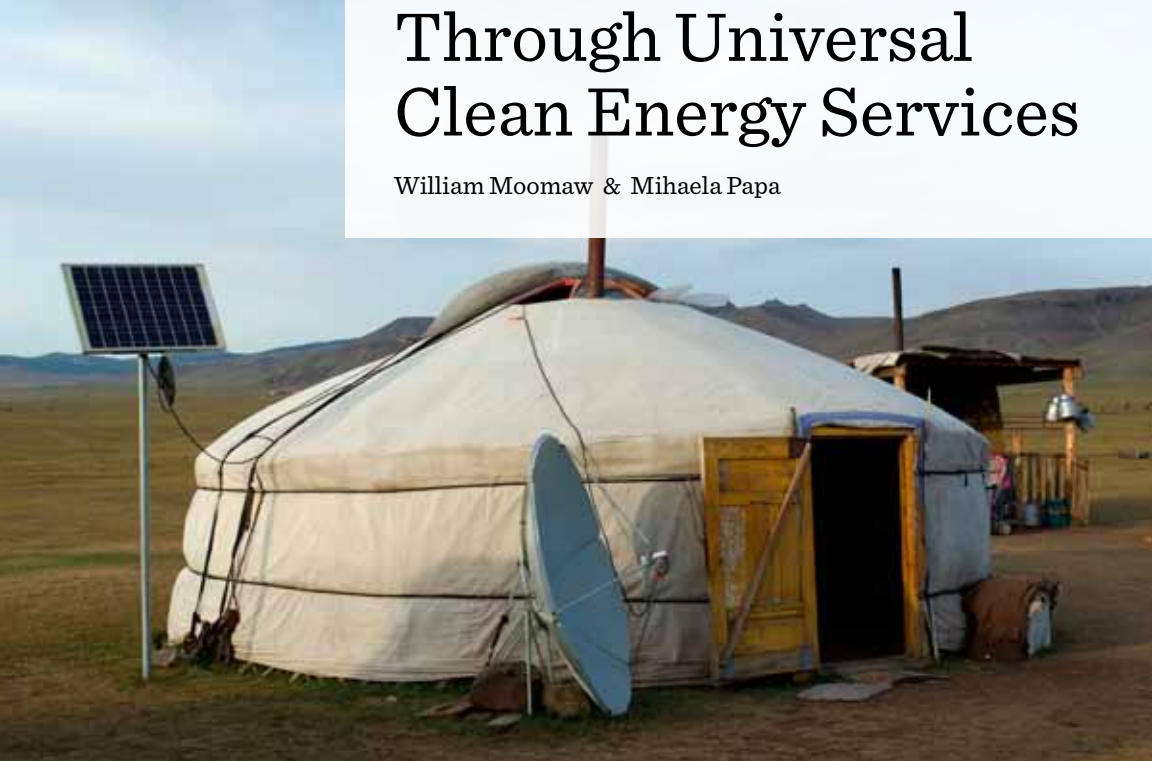
THE CENTER FOR
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SUSTAINABLE DEVELOPMENT DIPLOMACY AND
GOVERNANCE PROGRAM
THE FLETCHER SCHOOL | TUFTS UNIVERSITY



Creating a Mutual Gains Climate Regime Through Universal Clean Energy Services

William Moomaw & Mihaela Papa



Abstract

Climate change is a serious threat to all nations. This raises the question of why continuous treaty negotiations for more than two decades have failed to create a viable or adequate international climate regime. The current strategy of addressing climate change misdiagnoses the issue as a pollution problem by focusing on symptoms (emissions) and not on underlying causes (unsustainable development). In short, the wrong treaty is being negotiated. Drawing on negotiation analysis, it is argued that the existing and proposed climate treaties fail to meet the national interests of any party. An alternative strategy for addressing climate change is proposed that reframes the overall approach to reflect all countries' development needs and links climate protection goals to the development structure of the treaty. The current deadlock over emissions reductions might be overcome and a mutual gains agreement reached by directing international cooperation towards promoting the provision of clean energy services for development and ensuring universal access to those services as part of an 'early action' agenda that will complement efforts to utilize forests and reduce other greenhouse gases (GHGs) from multiple sectors.

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The Fletcher School at Tufts University was established in 1933 as the first graduate school of international affairs in the United States. The primary aim of The Fletcher School is to offer a broad program of professional education in international relations to a select group of graduate students committed to maintaining the stability and prosperity of a complex, challenging, and increasingly global society.

The Center for International Environment and Resource Policy (CIERP) was established in 1992 to support the growing demand for international environmental leaders. The Center provides an interdisciplinary approach to educate graduate students at The Fletcher School. The program integrates emerging science, engineering, and business concepts with more traditional subjects such as economics, international law and policy, negotiation, diplomacy, resource management, and governance systems.

The Sustainable Development Diplomacy and Governance Program (SDDG) focuses its research on the processes of creating policies and on how effectively alternative governance systems and policies can create sustainable development solutions. Negotiations over global and transboundary issues for the most part are locked into traditional models of diplomacy. Pioneering a new diplomacy of environment and resource policy will require new approaches based upon mutual gains principles of negotiation, stakeholder participation, the engagement of multiple institutions and coordination of multiple treaties and actions.



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Acronymns

CDM	Clean Development Mechanism
CO ₂	Carbon Dioxide
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
kW	Kilowatt
ODS	Ozone-Depleting Substances
REDD+	Reducing Emissions from Deforestation and Forest Degradation Plus
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

Section 1: Introduction

Climate change is one of the greatest global policy challenges of the 21st century. Scientists have reached consensus that warming of the climate system is attributable to human actions (IPCC, 2007). The impacts of climate change on ecosystem health and human well-being and, by extension, on the political, security, economic, developmental, and ethical aspects of international cooperation are well documented (IPCC, 2007), and adverse impacts of a substantially warmer climate are expected to fall disproportionately on developing countries. Failure to reverse the rapid rise in global temperature, increases the ongoing damage from climate change, requires more frequent intervention to alleviate acute impacts, raises the costs of adaptation, and increases the likelihood of major dangerous irreversible changes in the global climate system. In light of this, a key question is why have the climate negotiations remained deadlocked and failed to produce a viable and adequate climate treaty? This paper puts forward the argument that, unless the current approach to the problem changes, the prospect of producing an effective response seems bleak.

Drawing on climate policy scholarship and negotiation analysis, this article first analyses why the current approach does not produce an effective climate agreement. Arguing that the underlying national interests of most countries are surprisingly similar and focus on economic development rather than emissions reductions, it then asks how to build on each country's interests to create mutual gains outcomes for all parties. As climate change is fundamentally reframed as a development problem, a development-based approach to climate negotiations is proposed, which puts the choice of clean development pathways and universal access to clean energy services at the centre of the discussion. This approach enables parties to address climate change collaboratively, promote the discourse of opportunity, and set foundations for problem solving for the near- and long-term.

Section 2: Failure to Respond to the Underlying Causes of Climate Change

The current international strategy to address climate change is based on several assumptions: that CO₂ can be internationally regulated as a pollutant and as a commodity; that setting emission targets can be an incentive for countries to prevent overproduction of CO₂; and, that developed countries have the primary responsibility for emissions and should accept legally binding commitments to cut emissions before developing countries need to do so. This 'pollution model' strategy was formalized through the Kyoto Protocol (UNFCCC, 1997), the multinational agreement on GHG mitigation.

In December 2009, the parties to the United Nations Framework Convention on Climate Change (UNFCCC) and the parties to the Kyoto Protocol met in Copenhagen to chart the future of the international climate treaty and commit to deep cuts in emissions. Instead, the Conference produced the Copenhagen Accords (UNFCCC, 2010), which comprised a statement of intentions without any legally binding requirements. The Conference exposed the difficulties of building consensus on cutting emissions and illustrated the weaknesses of using the pollution model to respond to climate change. It is not in the short-term political interest of any single government to accept a portion of the emissions reduction burden to address what is a common set of universal, long-term practices that have led to global warming and climate change.

The two most pronounced weaknesses of the pollution model, that act as major obstacles to progress in climate negotiations, are (i) that it misdiagnoses climate change as pollution rather than as a development problem and (ii) in doing so, it promotes the negative message of 'burden sharing' rather than 'opportunity sharing.' The inability of the Cancun meeting in 2010 to do more than salvage the UN process further demonstrated that reaching mutual gains through international cooperation seems increasingly unlikely and that negotiators are losing trust in the relevance of the current approach.

2.1 MISDIAGNOSIS OF THE PROBLEM

When pressed to increase their commitment to reduce emissions, the responses of government officials are remarkably similar, and illustrate a near-universal agreement of why the current approach fails.

- ‘We will not cut our development potential’.¹
- (Our) ‘lifestyle is not up for negotiation’.²
- (It) ‘would cost us jobs and damage our industry’.³
- (It) ‘would have a negative impact on the living standards (...) and for the competitiveness and for our businesses’.⁴
- ‘A more ambitious target would constrict (our) development space’.⁵

Each of these statements is from a different world leader (President Dmitri Medvedev of Russia, President George W. Bush of the US, Prime Minister John Howard of Australia, Environment Minister Maciej Nowak of Poland and Environment Minister Jairam Ramesh of India, respectively), but they reflect a common concern: more stringent emission targets have been interpreted to mean a negative impact on the quality of life and a restriction on countries’ development potentials. The common belief is that increased GHG emissions mean more economic development. Because economic development is so heavily driven by energy, and nearly 85% of primary energy is from fossil fuels that produce CO₂ (Smil, 2006; IPCC, 2012), most governments (mistakenly) equate emissions with development. When they make this assumption, acting on climate change is seen as an additional drain on economic development, which is assuredly *not in the national interest of any country*.

However, emissions are only a symptom of the underlying problem: unsustainable development (see also Prins et al., 2010). The key question is not how to limit emissions or place constraints on the output of unsustainable development, but how to place constraints on the inputs in the development process, so that countries at different levels of development can make the transition to more climate-friendly development pathways (Heller and Shukla, 2003; Birdsall and Subramanian, 2009). Focusing on the symptoms of climate change has sidelined the imperative of rethinking the very choice of fossil fuels as inputs into the development process and diverts attention away from development strategies with ancillary climate benefits (IPCC, 2012). The Kyoto Protocol attempted to assist developing countries in climate change mitigation: the Clean Development mechanism (CDM) allows the crediting of emission reductions

¹ Russian President Dmitri Medvedev, quoted in Shuster (2009).

² George Bush referred to the American lifestyle when stating the US position at the 1992 Earth Summit.

³ In 2002, Australian Prime Minister Howard explained why Australia would not ratify the Kyoto Protocol (Howard, 2002).

⁴ Polish Environment Minister Maciej Nowicki quoted in AFP (2008).

⁵ India’s environment and forests minister Jairam Ramesh quoted in Venu and Narendranath (2010).

from GHG abatement projects in developing countries and has been used both to implement many specific projects and to enable developed countries to cut their emissions modestly (Metz, 2010). However, although the CDM process has evolved as an offsetting mechanism, it has been cumbersome and largely ineffective in providing the incentives for developing countries to pursue climate-protecting development paths consistently and at the necessary scale (Sterk et al., 2007; Schneider, 2009; Bakker et al., 2011).

As a result of the misdiagnosis of the problem, the focus on emissions has not produced the desired gains for either developing or developed countries. An asymmetry exists for developing countries. Although developing countries are expected to face 75–80% of the potential damage from climate change (World Bank, 2010), most have historically played a minor role in causing the problem. Their climate vulnerabilities and adaptation needs have been marginalized in international climate cooperation, and potential synergies between mitigation and adaptation remain largely underexplored (Beg et al., 2002; Davidson et al., 2003; Najam et al., 2003; Agarwala, 2005; Bradley et al., 2005; Pielke, 2005). Developed countries have also found emissions-centered policies problematic. Because emissions vary with levels of economic development, resource endowments and the pace of technological change, they have been difficult to manage, and the compliance of some countries like Japan, Australia, and especially Canada has been particularly weak (see also Victor, 2001; Prins and Rayner, 2007). International emissions trading has been established in the European Union, Norway, and New Zealand, but the degree of the impact of this mechanism has been limited given that the US, Canada, Australia, and Japan have remained outside the trading regime. Moreover, none of the large emitting developing countries have participated, even though developing countries now account for over half of global GHG emissions. The Kyoto Protocol prescribes property rights where the permitted global quota of emissions is divided among parties and is ‘legally binding,’ but like many (but not all) treaties, it cannot enforce compliance. Without universal acceptance by the key developed-country emitters (especially the US) of stringent, binding targets first, the pollution model has not delivered the results developing countries expected in the first commitment period, which has discouraged them from pursuing the same path due to both political and functional reasons. The framing of the problem therefore weakens the prospect for evolution of cooperation in the long term, and, as illustrated next, contributes to the negativism of the debate.

2.2 NEGATIVISM: PURSUING THE MINIMAL SHARE OF THE BURDEN

Because the dominant institutional response to climate change is conceptualized as a strategy for sacrifice, rather than investment and opportunity, negotiators have been speaking mostly of ‘burden sharing’ (see Nordhaus and Shellenberger, 2007; Baer et al., 2008; Parker, 2008; ENB, 2009; World Bank, 2010, p. 236). Countries argue that they should sacrifice less than other countries and develop defensive positions with

respect to binding emission targets. Hence, there is major discussion about equal per-capita rights to use the atmosphere for disposing of heat-trapping GHGs and about prioritizing current versus cumulative emissions. Countries approach climate negotiations as a conflict rather than a collaborative effort to solve a major problem, and they hold on to their fixed positions in order to minimize their losses. Such adversarial positional bargaining does not move the negotiations forward. A major clash of positions is apparent between the US (the biggest cumulative emitter of CO₂) and China (the biggest current emitter). Each country blames the other for its contribution to the problem and the lack of action (see Reuters, 2010). The tension between the US and China reflects a deeper political dynamic between developed and developing countries. Developed countries want developing countries also to act on their emissions, and some developing countries have pushed developed countries to acknowledge their responsibility for damage suffered from climate change (Tol and Verheyen, 2005).

Adversarial positions strengthen as the climate deteriorates over time (IPCC, 2007; Risbey, 2008) and as pressure builds on policy makers to develop a post-Kyoto Protocol reduction agreement for after 2012. As the deadlock continues, there is increasing doubt about the value of large-scale international climate negotiations and the importance of using global institutions to respond to climate change. Although criticism of the international cap-and-trade system in place is extensive (e.g. Guruswamy, 2007; Posner and Sunstein, 2009), a few scholars raise an even larger issue: the very utility of international law in addressing the problem of climate change. Some object to regulatory strategies focused on top-down approaches. Although the Kyoto Protocol allows states to choose how they implement their commitments, it does not give them similar flexibility in defining the form, nature, and content of their commitments (Bodansky, 2011). This suggests states may miss opportunities for incremental gains and innovation at other levels of governance (Osofsky, 2009). Others argue that the limits of international law in addressing climate change are present because the international system privileges economic interests above traditional legal rights and societal interests (Badrinarayana, 2010).

All of these criticisms demonstrate that the pollution model as a climate protection strategy undermines each party's perceived national interest and their ability to design and sustain international climate cooperation over time. This article asks whether an alternative model, sustainable development, would be more effective.⁶ It uses negotiation theory to consider how to transform the currently stalled negotiation process into a process that advances national interests and results in mutual gains.

⁶ See IPCC (2007) for a discussion of the relationship between climate change and sustainable development.

Section 3: Achieving Mutual Gains in Multiparty Negotiations

The field of negotiation analysis clearly demonstrates that it is possible to pursue a ‘mutual gains’ agreement for climate (in which all parties will exceed their next best option, which is no agreement) when parties engage in collaborative problem solving. The foundations of this approach have been established in Roger Fisher and William Ury’s book *Getting to Yes*, in which they introduced fundamental principles of negotiation that can help parties reach mutual gains outcomes: (i) separate the people from the problem; (ii) focus on interests, not positions; (iii) invent options for mutual gain; and (iv) insist on objective criteria (Fisher and Ury, 1981). The central idea behind these principles is that they can help parties avoid hard bargaining and adversarial negotiation style without giving in. These principles can result in ‘nearly self-enforcing’ *mutual gains agreements*, because to comply is in the interest of most parties. Focusing on interests rather than on negotiating positions can help parties achieve an agreement by consensus rather than compromising to the lowest common denominator. Finding common interests and mutual gains outcomes can enlarge the total value of the outcome and then many parties can claim a bigger share of value in the outcome in absolute terms (Susskind et al., 1999).

The Kyoto Protocol-based climate negotiations have violated most of the principles of mutual gains negotiations:

- Rather than separating the people from the problem, the key emitters have been engaged in a blame game about who is more responsible and who should act first rather than fully committing to joint problem solving.
- Negotiations have focused on positions where countries would make claims about their emission rights rather than ensuring that the interests behind these positions are aligned and reflect their interest in developing in a low-carbon manner.
- It was anticipated that the Kyoto ‘flexibility mechanisms’ would allow alternatives to the contentious requirement to reduce directly one’s own emissions and lower one’s potential for development and, at the same time produce gains for countries and the atmosphere. However, despite the establishment of international emissions trading, CDM and Activities Implemented Jointly, and the achieved cooperation benefits under such mechanisms (e.g. under CDM projects), the cooperation gains have been modest and not nearly of the scale required to either produce actual emissions reductions envisioned by the Kyoto Protocol or mobilize a critical mass of countries to speed up their transition to climate-friendly policies.
- Certainly, the Kyoto Protocol is clear on objective criteria in terms of emissions reductions, but the specific emission reduction requirements for each country

were arrived at through a system of political trading rather than any set of objective processes. They have therefore been seen as arbitrary by many, and have led some current participants to declare that they will not participate in another round of emissions reductions (France, Japan, and Canada).

UN negotiations present an opportunity to create value because there are many parties with many interests, which raises prospects for producing mutually beneficial agreements in addition to avoiding the adverse impacts of climate change. International settings enable parties to engage in the management of trans boundary challenges that they cannot effectively manage on their own and also help them avoid negative externalities. However, international environmental multiparty negotiations are difficult in multiple ways. First, the very large number of parties results in great complexity in the interactions due to the emergence of coalitions, complex process management requirements, and highly complex analytical challenges for stakeholders as they formulate their negotiation strategies (Susskind, 1994; Susskind and Crump, 2008). Second, environmental negotiations generally address collective-action problems comprising issues such as the use of open access common property resources and the provision of global public goods (Ostrom et al., 1999). Because free riding is possible and there is no effective public authority at the international level to enforce international environmental agreements, parties' commitments and implementation depend on their perception that they are acting in their own national interest and gaining from cooperation. Their continued cooperation can be sustained over time only if the agreement continues to deliver its negotiated benefits, and deters non-compliance and non-participation at the same time (Barrett, 2002, p. 355).

The history of multiparty environmental negotiations illustrates that it is feasible to achieve mutual gains agreements that are essentially self-enforcing, rational and fair, and do not need to rely on coercion but rather on socialization and reputational pressures to achieve compliance (Chayes and Chayes, 1993; Barrett, 2002). The Montreal Protocol on Substances that Deplete the Ozone Layer is an example of how to make the mutual gains approach work in practice. Chlorofluorocarbon production peaked at 1.1 million tonnes in 1986 (UNEP, 2005) and then ceased entirely in 2010 (UNEP, 2011). Many other ozone-depleting substances (ODS) have also been phased out, and the remaining few have been reduced substantially. Why has this agreement been so successful? Although the Montreal Protocol, like the Kyoto Protocol, is framed as a pollution control treaty, it has proven to be a model of cooperation achieving mutual gains for all parties by meeting the economic development needs of all parties. From the beginning, developing countries were assisted in shifting to substitute technologies that were already in use by developed countries. Several of the important producers of ODS had unilaterally abandoned some uses of ODS and developed substitute technologies, and economic incentives were aligned with social goals to protect the ozone layer so that the private sector rapidly developed many replacements for use in refrigeration, insulation, and elsewhere. The recognition of common but differentiated

responsibilities established a two-tier set of phase-out dates for all developed and developing countries. A Multilateral Ozone Fund (the Fund) and capacity building assisted developing countries in making the shift to substitutes.

The Montreal Protocol shifted the perception of restrictions on ozone-depleting pollutants from being a burden into an economic development opportunity. The Fund's activities included supporting the costs of production of substitutes for ODS, converting existing manufacturing facilities, establishing new ones, and retiring the obsolete ones (Chasek et al., 2010). A ban on imports of substances banned in developed countries, from developing countries that were still allowed to utilize them, substantially reduced leakage and assured developed-country firms that they would not be undercut by imports of banned substances. The combination of the ban and the Fund created an opportunity for major developing countries like China, who were working to bring the benefits of refrigeration and air conditioning to their own people, to make an early shift away from ODS and to develop the world's largest domestic and exporting industry for refrigerators and air conditioners. Such measures are weak in the case of climate change because of the lack of US engagement and the modest funding available for developing countries compared to the complexity of the challenge. However, as the next section will illustrate, the approach to creating value by addressing development needs and creating development opportunities, rather than focusing on pollution outputs, is essential to rethinking the climate process.

Section 4: Implementing a Mutual Gains Approach

How can the lessons from negotiation analysis be applied to revive the climate process and achieve mutual gains? Country representatives in climate negotiations are locked into their own government's position. In order to move negotiations forward, one common conflict resolution technique is to reassess the parties' underlying interests to reframe the way in which parties describe or define a disagreement. Reframing allows the parties to maintain their own interest in all its richness, but enables them to see it within the larger context of shared interests (Susskind et al., 1999; Mayer, 2000, p. 139).

This section argues that the current pollution model that defines international climate cooperation needs to be replaced with a new model that reflects countries' interest in development and is refocused on facilitating choices of clean development pathways. Countries engaged in climate negotiations have a common interest in both developing their economies and reducing the impact of climate change globally to protect their people, agriculture and coastal regions, and to reduce the risks from potentially irreversible and adverse changes to weather conditions. They also have a common interest in making their energy use more sustainable and secure through international cooperation. Even countries that are major producers of fossil fuels have begun, albeit slowly, to embrace these interests. For example, the Organization of the Petroleum Exporting Countries recognized in 2007 that it can gain from a more proactive role in encouraging accelerated development of carbon capture and storage technology, especially in the area of enhanced oil recovery, and started investing in such research (see Rubens, 2007). Also, Masdar, the low-carbon model city being developed in Abu Dhabi, is already creating exportable technologies and expertise. The climate protection treaty needs to be restructured to reflect the development interests of all countries, including a transition strategy for countries heavily dependent upon fossil fuels. Although the substantive shift in focus allows for the realization of mutual gains, the size of the climate challenge requires that the central norm in climate cooperation evolves, and generates support for international climate cooperation in the long term. Ensuring universal access to clean energy services, as argued here, has such a potential.

4.1 REFRAMING THE PROBLEM

The international strategy for a climate protection treaty needs to shift from focusing on outputs of unsustainable development to influencing inputs into the development process. Climate negotiations can be reframed by delinking development and emissions and refocusing on the choices among clean development pathways. Development can be accomplished without the continued use of fossil fuels and their associated emissions, because people need energy services not emissions (or even conventional energy) to develop (Lovins, 1976, p. 186–213). Energy services are the benefits delivered by end-

uses of energy (as opposed to energy consumption *per se*), and include cooking, lighting, mobility, comfort, and mechanical power (UNDP, 2005; Haas et al., 2008; IPCC, 2012). Reframing the problem of climate change as largely a problem of failure to provide clean, low-carbon, affordable energy services is important because the energy sector accounts for 60% of global emissions (UNDESA, 2009), and it is central to both climate and development. Deforestation, another major source of emissions and adaptation issues, is also crucial, but it appears that this may be effectively addressed through the Reducing Emissions from Deforestation and Forest Degradation plus (REDD+) process, and the remaining GHG emissions from agriculture and industry can be addressed in a manner similar to that described here for energy related CO₂ emissions. So, the inability of the negotiations process to reduce the use of fossil fuels has been the most intractable problem for governments and the bottleneck preventing overall progress.

Given that the largest underlying cause of carbon overload is the provision of energy services in an unsustainable way, and that addressing this has become the central challenge of a climate protection treaty, it is critical to find means for providing energy services with little or no heat-trapping emissions of CO₂. Once the challenge is defined in this way, measures to respond to climate change address a number of inputs in the development process, and the climate treaty can capture previously overlooked yet relevant contributors to the climate problem.

The choice of clean, low-carbon energy services is a more effective metric than emissions because it addresses what countries want and promotes their universal interest in development. Accentuating positive gains rather than preventing negative behaviors and outcomes leads to greater value creation in negotiation (Galinsky et al., 2005). Positive, mutual gains cooperation that improves climate outcomes already exist in practice. China–EU cooperation in wind power generation is a case in point. China and the EU complement each other in this field, because China is rich in wind-power resources with proven wind energy reserves of 3.2 billion kW, and is now the leading producer of on-shore wind turbines, while the EU leads in the offshore wind turbine industry and is also a major producer of onshore technology. Mutual gains are created if the EU sells advanced, offshore wind-power technologies and wind-turbine engineering to China, while China opens its market to the EU. Such transactions meet both countries' short-term interests and contribute to the long-term goal of reducing emissions. Although trade squabbles between the EU and China undoubtedly remain and the EU remains critical of investment conditions in China (especially in terms of intellectual property rights protection), linking markets for low-carbon growth is expected to accelerate market growth, cut down the costs, and begin to lay standards for the low-carbon transition (see Lee and Mabey, 2010). The challenge for the climate regime is to develop an institutional structure through which such cooperation projects can be aggregated to generate joint gains at a sufficiently large scale.

There are two major issues for a restructured treaty: (i) how to engage governments in meeting both the development and climate goals of the treaty — incentives for both

developed and developing countries, and (ii) setting goals in terms of energy services and reviewing how they address both development and climate goals through adaptive treaty management.

First, developed-country governments have shown the approach is feasible and a treaty can be restructured to provide incentives for strengthening such practices. Two recent studies illustrate the feasibility of low-carbon development. First, the European Climate Foundation (ECF, 2010) found that a transition to a low- or zero-carbon power supply based on high levels of renewable energy would have no impact on reliability, and would have little overall impact on the cost of generating electricity. Second, the European Renewable Energy Council (EREC, 2010) found that the EU could not only meet up to 100% of its electricity demand from renewables by 2050, but also all of its heating/cooling and transport fuel needs. The IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation provides an extensive technology-level review of the potential for renewable energy to provide energy services and concludes that renewable energy can supply nearly 80% of primary energy by 2050 with appropriate policies (IPCC, 2012). While new opportunities for low-carbon development are continuously emerging, this substantive shift in countries' approaches to climate change integrates the energy issue more fully with climate protection goals and the larger sustainable development framework. The energy services approach also encourages developed countries to focus on their inputs into their own development process and explore how to promote energy efficiency. Many energy services can be delivered with as little as one-fifth of the energy that is commonly used today (Weizsäcker et al., 2009). The IPCC Special Report on Renewable Energy describes the synergistic relationship between reducing the energy required to provide an energy service and the capacity to supply that service from renewable energy sources (IPCC, 2012). Furthermore, the generation of electric power by fossil-fuel combustion wastes approximately two thirds of the heat content of the burned fuel, and vehicle engines waste 80% of the heat content of liquid fuels (Jacobson, 2009). Hence, most CO₂ emissions arise from waste heat (Stern, 2009). For example, capturing and utilizing currently wasted heat from electric-power generation in the US could displace nearly 30% of fossil-fueled electricity generation, lower US CO₂ emissions by 20%, and save US\$150–250 billion per year (Casten and Munson, 2009).

Some of these savings can be reinvested in additional climate protection technologies within developed countries, encouraged by regulations and market-based policies. Financing for official development assistance and private sector investment in developing countries in a manner that is consistent with international climate protection goals will require a combination of traditional development assistance and creating investment opportunities. This approach will need to benefit both developed-country manufacturers and developing-country economies. For example, the Danish government has successfully supplied Danish-manufactured wind turbines as part of their development assistance programme (Sawin, 2001).

To make energy services available to the poorest populations, private companies are developing new technologies and innovative financial partnerships with NGOs to finance them through a portfolio of grants, innovative small loans, and extended payment plans. Decentralized renewable energy is more likely to provide services directly to the poor and alleviate poverty because it is a cost-effective and scalable approach to rural electrification, as has been demonstrated in countries like Bangladesh (Barua et al., 2001; Mondal et al., 2010) and Kenya (Jacobson, 2007), where solar panels are integrated with devices that can supply services such as lighting, television or radio entertainment and information, mobile phone chargers, or simple power tools or sewing machines that enhance the productivity of livelihoods. The example of successful deployment of renewable technologies in other low-income developing countries demonstrates the feasibility of a portfolio financing strategy (Ashden Awards for Sustainable Energy, 2008). It can reduce health risks by improving access to safe water and sanitation and reducing exposure to indoor air pollutants. It enables irrigation pumping and postharvest processing, thereby protecting vulnerable populations from reductions in food availability induced by climate change, and it contributes to local long-term energy supply security (see Kane and Shogren, 2000; Venema and Cisse, 2004; Klein et al., 2005; Halsnæs and Verhagen, 2007; Martens et al., 2009). Black carbon (soot produced through diesel emissions and burning biomass for cooking and heating) is another case in point. Black carbon is a contributor to a significant portion of current net warming, and it is considered responsible for about 30% of the arctic melting. Replacing biomass fuels with sustainable clean-energy cooking services supplied by biogas or solar energy would enhance climate goals as well as save millions of lives each year lost due to air pollution from indoor fires (Baron et al., 2009; Molina et al., 2009). Reducing the unsustainable use of traditional forest-based biomass fuels also directly addresses a significant source of CO₂ and retains forests as a carbon sequestration measure. At the large central electric-power scale, the World Bank Clean Technology Fund is financing the largest wind project and largest concentrating solar power projects in Africa for the South African government, and other large-scale renewable projects in other developing countries. The Asian Development Bank is poised to finance a 5MW solar project in India.

The second aspect of the substantive shift is to set goals in terms of energy services and review how they address both development and climate goals through adaptive treaty management. Establishing energy service goals benefits negotiations because it does not single out or put pressure on any single bloc of countries relative to another bloc, and it reduces the key concerns of developing countries about the mitigation bias of climate cooperation because they can capitalize on synergies between mitigation and adaptation. It takes into account different stages of development and focuses on improving access to energy service delivery. This is especially important in developing countries where the bulk of energy infrastructure has yet to be built and in developed countries where fossil-fuel subsidies and overconsumption are major barriers to climate and sustainability.

The climate protection component of the treaty needs to be designed to address general obligations as well as specific issue areas, perhaps through separate protocols such as, for example, a protocol on promoting energy efficiency and clean energy services (Nicol, 2011), a protocol for other GHGs such as methane and nitrous oxide, a protocol on black carbon, a protocol on achieving synergies between mitigation and adaptation, and protocols on other relevant issues such as geoengineering and climate refugees. The REDD+ agreement on protecting forests demonstrates the success of this approach. Once climate response is disaggregated through separate protocols, it is easier to both make and measure progress.

4.2 TOWARDS A DIFFERENT NORMATIVE PUSH FOR ACTION

A mutual gains agreement assumes that countries are better off with an agreement than with the alternatives to the agreement, but their perceptions of gains from the agreement may change over time. As countries' rational incentives for engagement vary (e.g. due to leadership, technological innovation), the normative dimension of their engagement with climate change is particularly relevant. Norms are the standards of appropriate behaviour within a certain group. The central norm of the climate treaty is that the proper behaviour to protect the climate is to reduce GHG emissions. Ideally, this norm would have evolved if states had embraced it; once the critical mass of relevant states was persuaded that this was the right thing to do, then the norm would acquire a 'taken for granted quality' (Finnemore and Sikkink, 1998). This norm clearly emerged although despite a myriad of norm entrepreneurs, it did not acquire sufficient adoption that would lead to its internalization by relevant states such as the major emerging economies and the US.

Once climate change is reframed as a problem of unsustainable development that can best be addressed by providing clean energy services, it is essential to create a set of measures that will make these services available. About 1.5 billion people still lack access to electricity (AGECC, 2010), and around 2.5 billion people contribute significant amounts of CO₂ to the atmosphere and climate-warming black carbon by the unsustainable use of firewood and other biomass as their primary source of energy (IEA, 2009). Reducing energy poverty is crucial for their development. In energy poor communities, an additional unit of energy service brings far greater substantial improvement in quality of life than in energy-rich communities (UNDP, 2005; Gaye, 2007; Haas et al., 2008).

The provision of clean energy services is also difficult in rich countries, especially when energy sources are used in an unsustainable way through overconsumption and a failure to constrain the use of high-carbon pathways. For example, fossil-fuel subsidies around the world were US\$557 billion in 2008, up from US\$342 billion in the previous year (IEA, 2010). The opportunity for all to benefit from enhanced technological and commercial innovation and expanded energy markets should engage the private

sector, which in many cases has taken a defensive posture to protect the fossil-fuel *status quo*. There seems to be international political momentum to phase out fossil-fuel subsidies, and some governments have introduced carbon taxes. Leaders of the G20 group of emerging and developed nations agreed in September 2009 to a US plan to work towards phasing out fossil-fuel subsidies, and the World Trade Organization (WTO) is currently reflecting on the prospects of WTO enforced restrictions on multibillion-dollar fossil-fuel subsidies. The International Renewable Energy Agency and the Organization for Economic Cooperation and Development could also promote this agenda to raise the costs of carbon-intensive fuels relative to alternative means of providing energy services. Given the complexity of transitioning from fossil fuels to renewable energy technologies, a new normative push is needed to move the process forward without waiting to remove subsidies.

Both in developed and developing countries, the starting point for facilitating the pursuit of clean development pathways is the same: consumers must have access to a choice of clean, low-carbon energy services. Making universal access to a defined set of energy services a normative goal of the treaty with specific commitments and target dates is one way to establish the development framework. It may also be argued that ensuring access to clean energy services is not just a policy priority – it should be promoted as a human right (see also Tully, 2006; Bradbrook and Gardam, 2010) because urgent action on climate is needed to protect both the dignity and equality of all human beings, human development, and the life of the planet. The UN General Assembly has recently made access to water a human right for these basic reasons. Just as countries coming out of the Second World War created the Universal Declaration of Human Rights to set out the first global commitment to the inherent dignity and equality of all human beings, it is essential today to protect the climate by assuring access to low-carbon energy services to protect human well-being. The Declaration was an aspirational document at a time when states could not agree on the definition or the source of human rights and responsibility for enforcing the rights in state territory, but it enabled the evolution of universal human rights standards over time. Similarly, realizing the right to access clean energy services may evolve into a standard over time, especially given that this norm fits in with existing normative frameworks and has eager promoters. There would surely be debate over which energy services fall within the definition of essential energy services in developing countries, and where the dividing line is between those services that are a *right* and those that will be added over time to the large number already in use in developed nations. In all cases, it will be necessary to make an explicit link between the provision of energy services as a primary development strategy and the climate implications of the particular energy source that is selected to provide it. There will need to be an adaptive management strategy in place to monitor development and climate progress, to incorporate innovations, and to alter course as new information on both climate and the effectiveness of specific technologies and measures is assessed.

The legal foundation for the right to access clean energy services lies in their importance in resolving both poverty and environmental degradation. These links were explicitly acknowledged at the 2002 World Summit on Sustainable Development. The Johannesburg Plan on Implementation adopted at the Summit conceptualizes access to energy services as a prerequisite for realizing basic human needs including those defined in the UN Millennium Development Goals. The Plan calls for increasing energy efficiency, decreasing energy consumption, and transitioning to cleaner energy systems, and also calls for removing harmful subsidies. Efforts to translate access to energy services from a theoretical concept and a broad policy goal into practice have been improving. Studies measuring access to energy services (Bazilian et al., 2010) and attempts to frame the UN global target for universal access to energy services by 2030 (AGECC, 2010) are cases in point. However, only access to ‘clean’ energy services can enable people to realize their right to development and their human rights more generally while providing climate mitigation and adaptation responses (Orellana, 2010).

The norm of a universal right of access to clean energy services can be actively built by already existing norm entrepreneurs, such as those countries already implementing feed-in laws and the communities where a renewable pathway is cheaper and easier (e.g. rural electrification in developing countries). The parties to the UNFCCC need to explicitly acknowledge that *it is the right of every person and the goal of the treaty to provide all persons with access to low-carbon clean energy services in a manner that does not jeopardize the climate system or decrease the ability of the environment to continue supplying ecosystem services*. This right must be actively constructed and promoted at both national and international levels.

Section 5: Conclusions

There has been no shortage of analyses of the current climate negotiations and its shortcomings. The challenge for negotiators is both how to revive the process in the short term and how to ensure long-term cooperation. This article summarizes the previous arguments that attempt to explain why a comprehensive treaty regime has failed to materialize, and finds that they fall into four basic categories:

- **Development constraints:** emissions reduction will harm economic development.
- **Lack of trust:** other countries will gain an economic advantage or find a way to use mitigation to their advantage.
- **Weakness of international agreements:** treaties are inherently incapable of meeting climate goals; they cannot assure compliance or create and protect carbon property rights.
- **Negative psychology:** pollution control is all about burden sharing and limits, and there is a preference for blaming others rather than accepting responsibility.

Many of these critiques are convincing, but this article provides the first analysis to utilize established negotiations theory to determine why these factors have prevented a successful climate agreement. A key conclusion is that *basing the negotiations on a pollution model fails to address the underlying cause, and works against each national interest by emphasizing ‘burden sharing.’* It is argued that the pollution model of minimizing carbon emissions needs to be replaced with a new mutual gains model that reframes the current blocked process and replaces it with a development approach. This can be accomplished by changing the focus from cutting emissions (a symptom) to promoting sustainable development within the treaty by enshrining the right of universal access to clean, low-carbon energy services.

This has advantages for nations at all stages of economic development and for the private sector. This shift in framing can also produce co-benefits to protecting the climate system, including poverty reduction, job creation, new economic opportunities in all countries, energy security, and improved air quality and health. Structuring the treaty to meet the interests of nations at all stages of development, as well as the interests of the private sector, is essential. The importance of technological reciprocity (including co-benefits) in achieving mutual gains for nations and the private sector has been demonstrated by de Coninck (2009). Assurance of access to energy services should reassure developing countries that a climate regime is foremost about development and the elimination of poverty, and hence in their own interests. Framing the issue in terms of assured energy services, in a manner that does not contribute to climate change, will assure those in emerging and more affluent economies that this is not about sacrificing lifestyle values but rather about meeting their interests through alternative technologies.

Ideally, one might start over with a completely new treaty with specific protocols as outlined earlier in this article, but this may be unrealistic given that more than 20 years has been invested in the current process by many people, governments, and international institutions. Fortunately, the low-carbon development process could begin by using the existing authority for technology transfer, financial assistance and capacity-building provisions that are part of the existing UNFCCC and Kyoto Protocol, while negotiations could continue on the contentious issues of specific targets, timetables, and emissions reduction obligations. This approach inverts the priorities now in the Protocol and puts low-carbon development alongside REDD+ and climate-smart agriculture as early action strategies. The protocols described earlier can be added to the UNFCCC, and because there already appears to be agreement to limit warming to 2°C as a climate stabilization goal, it should be possible to link the replacement of high-carbon technologies with specific goals for low-carbon energy services. There is also nothing to prevent the delivery of clean energy services and other carbon-reducing technologies and measures from proceeding on a supportive, parallel track utilizing existing bilateral and multilateral development programmes and the principles outlined here. “The Sustainable Energy for All Initiative” of the United Nations can provide a platform for this effort. The stated goal is to “seek universal access to modern energy services, double the rate of improvement in energy efficiency, and double the share of renewable energy in the global energy mix by 2030.” (UN, 2012) To this should be added, “and to link these goals to the reduction of greenhouse gases by half.” To achieve an effective and acceptable climate regime it is necessary to use sustainable development diplomacy to create mutual gains that meet multiple interests rather than continuing to pursue a divisive pollution control treaty.

Bibliography

AGECC, 2010, Energy for a Sustainable Future, Report to the United Nations Secretary General, Advisory Group on Energy and Climate Change, United Nations, New York.

AFP, 2008, 'EU nations voice objections to climate change plan', AFP, 3 March [available at <http://afp.google.com/article/ALeqM5grF6FcbvqRcFW8A4cGxtV-DHHHmg>].

Agarwala, S. (ed), 2005, Bridge over Troubled Waters: Linking Climate Change and Development, OECD Publishing, Paris.

Ashden Awards for Sustainable Energy, 2008, Rapidly Growing Solar Installer also Provides Clean Cooking,

Ashden Awards for Sustainable Energy, London, UK [available at www.ashdenawards.org/winners/grameen08].

Badrinarayana, D., 2010, 'Global warming: a second coming for international law?', *Washington Law Review* 85(2), 253–293.

Bakker, S., Haug, C., Van Asselt, H., Gupta, J., Sai'di, R., 2011, 'The future of the CDM: same same, but differentiated?', *Climate Policy* 11(1), 752–767.

Baer, P., Athanasiou, T., Kartha, S., Kemp-Benedict, E., 2008, The Greenhouse Development Rights Framework – The Right to Development in a Climate Constrained World (revised 2nd edn), Heinrich Böll Foundation, Christian Aid, EcoEquity and the Stockholm Environment Institute, Berlin and Albany.

Barrett, S., 2002, *Environment and Statecraft: The Strategy of Environmental Treaty-Making*, Oxford University Press, Oxford.

Baron, R.E., Montgomery, W.D., Tuladhar, S.D., 2009, *An Analysis of Black Carbon Mitigation as a Response to Climate Change*, Copenhagen Consensus Center, Copenhagen.

Barua, D.C., Urmee, T.P., Kumar, S., Bhattachary, S.C., 2001, 'A photovoltaic solar home system dissemination model', *Progress in Photovoltaics: Research and Applications* 9(4), 313–322.

Bazilian, M., Nussbaumer, P., Cabraal, A., Centurelli, R., Detchen, R., Gielen, D., Rogner, H., Howells, M., McMahon, H., Modi, V., Nakicenovic, N., O'Gallachoir, B., Radka, M., Rijal, K., Takada, M., Ziegler, F., 2010, *Measuring Energy Access: Supporting a Global Target*, United Nations and the Earth Institute at Columbia University, New York.

Beg, N., Marlot, J.C., Davidson, O., Afrane-Okesse, Y., Tyani, L., Denton, F., Sokona, Y., Thomas, J.P., La Rovere, E.L., Parikh, J.K., Rahman, A.A., 2002, 'Linkages between climate change and sustainable development', *Climate Policy* 2(2–3), 129–144.

Birdsall, N., Subramanian, A., 2009, Energy Needs and Efficiency, not Emissions: Re-framing the Climate Change Narrative, Working Paper No. 187, Center for Global Development, Washington, DC.

Bodansky, D., 2011, A tale of two architectures: the once and future U.N. climate change regime (1 March 2011) [available at <http://ssrn.com/abstract=1773865>].

Bradbrook, A.J., Gardam, J.G., 2010, 'Energy and poverty: a proposal to harness international law to advance universal access to modern energy services', *Netherlands International Law Review* LVII, 1–28.

Bradley, R., Pershing, J., Schipper, L., Baumert, K.A., Dubash, N.K., Moreira, J.R., Mwakasonda, S., Ng, W., Horta Nogueira, L.A., Parente, V., Winkler, H., 2005, *Growing in the Greenhouse: Protecting the Climate by Putting Development First*, World Resources Institute, Washington, DC.

Casten, T., Munson, D., 2009, Deploying Clean Energy: Overcoming Regulatory Barriers, White Paper, Recycled Energy Development, LLC, Westmont.

Chasek, P.S., Downie, D.L., Brown, J.W., 2010, *Global Environmental Politics* (5th edn), Westview Press, Boulder, CO.

Chayes, A., Chayes, A.H., 1993, 'On compliance', *International Organization* 47(2), 175–205.

Davidson, O., Halsnaes, K., Huq, S., Kok, M., Metz, B., Sokona, Y., Verhagen, J., 2003, 'The development and climate nexus: the case of sub-Saharan Africa', *Climate Policy* 3(S1), 97–113.

de Coninck, H., 2009, Technology Rules! Can Technology-Oriented Agreements Help Address Climate Change?, PhD dissertation, Vrije Universiteit, Amsterdam.

Earth Negotiation Bulletin (ENB), 2009, Summary of the Bonn Climate Change Talks: 10–14 August, 12(427), IISD Reporting Services, Manitoba, Canada [available at <http://www.iisd.ca/download/pdf/enb12427e.pdf>].

ECF, 2010, *Roadmap 2050: A Practical Guide to a Prosperous, Low-Carbon Europe*, European Climate Foundation, The Hague, The Netherlands [available at http://www.roadmap2050.eu/attachments/files/Volume1_fullreport_PressPack.pdf].

EREC, 2010, *Re-thinking 2050: A 100% Renewable Energy Vision for the European Union*, European Renewable Energy Council, Brussels, Belgium.

Finnemore, M., Sikkink, K., 1998, 'International norm dynamics and political change', *International Organization* 52(4), 887–917.

Fisher, R., Ury, W., 1981, *Getting to Yes: Negotiating Agreement without Giving In*, with B. Patton (ed), Houghton Mifflin, Boston, MA.

Galinsky, A.D., Leonardelli, G.J., Okhuysen, G.A., Mussweiler, T., 2005, 'Regulatory focus at the bargaining table: promoting distributive and integrative success', *Personality and Social Psychology Bulletin* 31(8), 1087–1098.

Gaye, A., 2007, Access to Energy and Human Development, Background Paper for Human Development Report 2007–2008, United Nations Development Programme, New York, NY.

Guruswamy, L., 2007, 'Can international law protect the Earth's natural resources?', Proceedings of the 101st Annual Meeting of the American Society of International Law 101, January 2007, American Society of International Law, Washington, DC.

Haas, R., Nakicenovic, N., Ajanovic, A., Faber, T., Kranzl, L., Müller, A., Resch, G., 2008, 'Towards sustainability of energy systems: a primer on how to apply the concept of energy services to identify necessary trends and policies', *Energy Policy* 36(11), 4012–4021.

Halsnæs, K., Verhagen, J., 2007, 'Development based climate change adaptation and mitigation – conceptual issues and lessons learned in studies in developing countries', *Mitigation and Adaptation Strategies for Global Change* 12(5), 665–684.

Heller, T.C., Shukla, P.R., 2003, 'Development and climate: engaging developing countries', in: J.E. Aldy, J. Ashton, R. Baron, D. Bodansky, S. Charnovitz, E. Diringer, T.C. Heller, J. Pershing, P.R. Shukla, L. Tubiana, F. Tudela, X. Wang (eds), *Beyond Kyoto: Advancing the International Effort against Climate Change*, Pew Center on Global Climate Change, Arlington, VA, 111–141.

Howard, J., 2002, 'Answers to questions without notice', Representatives, 5 June, p. 3163 [available at www.aph.gov.au/library/INTGUIDE/SCI/kyoto.htm#_edn8].

IPCC, 2007, Climate Change 2007: Synthesis Report, Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, R.K. Pachauri, A. Reisinger (eds), Intergovernmental Panel on Climate Change, Geneva, Switzerland.

IPCC, 2012, Renewable Energy Sources and Climate Change Mitigation, Special Report of the Intergovernmental Panel on Climate Change, O. Edenhofer, R.P. Madrugá, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schloßner, C. von Stechow (eds), Intergovernmental Panel on Climate Change, Cambridge University Press, New York, NY [available at www.ipcc-wg3.de/publications/special-reports/srren].

IEA (International Energy Agency), 2009, World Energy Outlook 2009, Organisation for Economic Cooperation and Development/IEA, Paris.

IEA, 2010, Energy Subsidies: Getting the Prices Right, Office of the Chief Economist, International Energy Agency, Paris, 7 June [available at www.iea.org/files/energy_subsidies.pdf].

Jacobson, A., 2007, 'Connective power: solar electrification and social change in Kenya', *World Development* 35(1), 144–162.

Jacobson, M.Z., 2009, 'Review of solutions to global warming, air pollution, and energy security', *Energy and Environmental Science* 2, 148–173.

Kane, S., Shogren, J.F., 2000, 'Linking adaptation and mitigation in climate change Policy', *Climatic Change* 45(1), 75–102.

Klein, R.J.T., Schipper, L.F., Dessai, S., 2005, 'Integrating mitigation and adaptation into climate and development policy: three research questions', *Environmental Science & Policy* 8(6), 579–588.

Lee, B., Mabey, N., 2010, 'An alliance worth striving for', ChinaDialogue, 12 October [available at www.chinadialogue.net/article/show/single/en/3868-An-alliance-worth-striving-for].

Lovins, A.B., 1976, 'Energy strategy: the road not taken', *Foreign Affairs* 55(1), 65–96.

Martens, P., Mcevoy, D., Chang, C., 2009, 'The climate change challenge: linking vulnerability, adaptation, and mitigation', *Current Opinion in Environmental Sustainability* 1(1), 14–18.

Mayer, B., 2000, *The Dynamics of Conflict Resolution*, Jossey-Bass Publishers, San Francisco, CA.

Metz, B., 2010, *Controlling Climate Change*, Cambridge University Press, Cambridge, UK.

Molina, M., Zaelke, D., Sarma, K.M., Andersen, S.O., Ramanathan, V., Kaniaru, D., 2009, 'Reducing abrupt climate change risk using the Montreal Protocol and other regulatory actions to complement cuts in CO₂ emissions', *Proceedings of the National Academy of Sciences of the USA* 106, 20616–20621.

Mondal, M.A.H., Kamp, L.M., Pachova, N.I., 2010, 'Drivers, barriers, and strategies for implementation of renewable energy technologies in rural areas in Bangladesh – an innovative system analysis', *Energy Policy* 38, 4626–4634.

Najam, A., Huq, S., Sokona, Y., 2003, 'Climate negotiations beyond Kyoto: developing countries concerns and interests', *Climate Policy* 3(3), 221–231.

Nicol, L.A., 2011, 'The role of institutional regimes in motivating change for sustainable housing', *Building Research and Information* 39(5), 459–472.

Nordhaus, T., Shellenberger, M., 2007, *Break Through: From the Death of Environmentalism to the Politics of Possibility*, Houghton Mifflin, New York, NY.

- Orellana, M., 2010, Climate change and the right to development: international cooperation, financial arrangements, and the clean development mechanism, Paper prepared by the Center for International Environmental Law (CIEL) for the 15th session of the Human Rights Council, Working Group on the Right to Development, A/HRC/15/WG.2/TF/CRP.3/Rev.1, 10 February, Geneva, Switzerland.
- Osofsky, H., 2009, 'Is climate change "international"? Litigation's diagonal regulatory role', *Virginia Journal of International Law* 49(3), 588–589.
- Ostrom, E., Burger, J., Field, C.B., Norgaard, R.B., Policansky, D., 1999, 'Revisiting the commons: local lessons, global challenges', *Science* 284(5412), 278–282.
- Parker, D., 2008, 'Sharing the burden of climate change', *Policy Quarterly* (Special Issue on Global Climate Change Policy: Burden Sharing Post-2012) 4(4), 3–6.
- Posner, E.A., Sunstein, S.R., 2009, 'Should greenhouse gas permits be allocated on a per capita basis?', *California Law Review* 97(1), 51–93.
- Pielke Jr., R.A., 2005, 'Misdefining 'climate change': consequences for science and action', *Environmental Science & Policy* 8(6), 548–561.
- Prins, G., Rayner, S., 2007, 'Time to ditch Kyoto', *Nature* 449, 973–975.
- Prins, G., Galiana, I., Green, C., Grundmann, R., Hulme, M., Korhola, A., Laird, F., Nordhaus, T., Pielke, R.A. Jr, Rayner, S., Sarewitz, D., Shellenberger, M., Stehr, N., Tezuka, H., 2010, The Hartwell Paper: A New Direction for Climate Policy after the Crash of 2009, Institute for Science, Innovation and Society, University of Oxford, Oxford and MacKinder Program for the Study of Long Wave Events, London School of Economics, London [available at www.collide-a-scape.com/wp-content/uploads/2010/05/The-Hartwell-Paper.pdf].
- Reuters, 2010, 'China calls US a pig in the mirror on climate change', *World Bulletin*, 9 October [available at www.worldbulletin.net/news_detail.php?id=64964].
- Risbey, J.S., 2008, 'The new climate discourse: alarmist or alarming?', *Global Environmental Change* 18(1), 26–37.
- Rubens, C., 2007, 'OPEC takes on global warming', Gigaom Cleantech, 19 November [available at <http://gigaom.com/cleantech/opec-takes-on-global-warming/>].
- Sawin, J.L., 2001, The Role of Government in the Development and Diffusion of Renewable Energy Technologies: Wind Power in the United States, California, Denmark and Germany, 1970–2000, PhD dissertation, The Fletcher School, Tufts University, MA.
- Schneider, L., 2009, 'A Clean Development Mechanism with global atmospheric benefits for a post-2012 climate regime', *International Environmental Agreements: Politics, Law and Economics* 9(2), 95–111.

- Shuster, S., 2009, 'Russia still dragging its feet on climate change', *Time*, 4 November [available at www.time.com/time/specials/packages/article/0,28804,1929071_1929070_1934785,00.html#ixzz14YuqIXSS].
- Smil, V., 2006, '21st century energy: some sobering thoughts', *OECD Observer* 258–259, 22–23.
- Sterk, W., Dienst, C., Harmeling, S., Schüwer, D., 2007, *Renewable Energy and the Clean Development Mechanism: Potential Barriers and Ways Forward: A Guide for Policy-Makers*, The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety Public Relations Division, Berlin, Germany.
- Sterner, M., 2009, *Bioenergy and Renewable Power Methane in Integrated 100% Renewable Energy Systems: Limiting Global Warming by Transforming Energy Systems*, PhD dissertation, University of Kassel, Kassel, Germany.
- Susskind, L., 1994, *Environmental Diplomacy: Negotiating More Effective Global Agreements*, Oxford University Press, New York and Oxford.
- Susskind, L., Crump, L., 2008, *Multiparty Negotiation: An Introduction to Theory and Practice*, Sage Publications, London and the Program on Negotiation at Harvard Law School, Cambridge, MA.
- Susskind, L., McKeen, S., Thomas-Larmer, J., 1999, *The Consensus Building Handbook*, Sage Publications, Thousand Oaks, CA.
- Tol, R.S.J., Verheyen, R., 2005, 'State responsibility and compensation for climate change damages — a legal and economic assessment', *Energy Policy* 32, 1109–1130.
- Tully, S.R., 2006, 'The contribution of human rights to universal energy access', *Northwestern Journal of International Human Rights* 4(3), 1–31.
- UN, 2012, Sustainable Energy for All Initiative. <http://www.sustainableenergyforall.org/>.
- UNDESA, 2009, *World Economic and Social Survey 2009: Promoting Development, Saving the Planet*, E/2009/50/Rev.1, ST/ESA/319, United Nations Department of Economic and Social Affairs, United Nations, New York, NY.
- UNDP, 2005, *Energising the Millennium Development Goals: A Guide to Energy's Role in Reducing Poverty*, United Nations Development Programme, New York, NY.
- UNEP, 2005, *Production and Consumption of Ozone Depleting Substances under the Montreal Protocol 1986–2004*. Ozone Secretariat [available at http://ozone.unep.org/Publications/Production_and_consumption2005.pdf].
- UNEP, 2011, *Key Achievements of the Montreal Protocol to Date*, Ozone Secretariat, United Nations Environmental Programme, Nairobi, Kenya [available at http://ozone.unep.org/Publications/MP_Key_Achievements-E.pdf].

UNFCCC, 1997, Kyoto Protocol to the United Nations Framework Convention on Climate Change, FCCC/CP/1997/L.7/Add.1, United Nations Framework Convention on Climate Change, Bonn, Germany [available at <http://unfccc.int/resource/docs/convkp/kpeng.pdf>].

UNFCCC, 2010, 'Copenhagen Accord', Decision 2/CP.15, FCCC/CP/2009/11/Add.1, United Nations Framework Convention on Climate Change, Bonn, Germany [available at http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&preref=600005735#beg].

Venema, H.D., Cisse, M., 2004, *Seeing the Light: Adapting to Climate Change with Decentralized Renewable Energy in Developing Countries*, International Institute for Sustainable Development, Manitoba, Canada.

Venu, M.K., Narendranath, K.G., 2010, 'When BASIC countries negotiate, we're one voice', *Financial Times*, 25 January [available at www.financialexpress.com/news/-When-BASIC-countries-negotiate--we-re-one-voice-/571224/].

Victor, D., 2001, *The Collapse of the Kyoto Protocol and the Struggle to Slow Global Warming*, Princeton University Press, Princeton, NJ and Oxford.

Weizsäcker, E.U., Von Hargroves, K., Smith, M.H., Desha, C., Stasinopoulos, P., 2009, *Factor Five: Transforming the Global Economy Through 80% Improvements in Resource Productivity*, Earthscan/The Natural Edge Project, London and Sterling, UK.

World Bank, 2010, *World Development Report 2010: Development and Climate Change*, World Bank, Washington, DC.

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