Building Trust and Cooperation in a North–South Climate Change Compact

What role for environmental regulators?

Global Climate Network Briefing Paper

By David Nash, Andrew Pendleton and Simon Retallack

October 2009

www.globalclimatenetwork.info

The Global Climate Network

The Global Climate Network is an alliance of nine influential, progressive think tanks located in countries where taking action on climate change really matters. We bring together some of the world's brightest brains to figure out and propose progressive solutions to climate change that will also help lay the foundations for a new era of prosperity.

Our focus is on policy. We will work with decision makers on innovations that help clear space for progressive action on climate change. Each of us enjoys international renown, but understands that domestic transformation is the key to successful global action.

ippr UK (also secretariat for the Network): The UK's leading progressive think tank with a strong track record on research and policy.

Center for American Progress USA: Founded and run by John Podesta, former Chief of Staff to President Clinton, who recently ran President Obama's transition team.

The Energy and Resources Institute India: Its director is Dr Rajendra Pachauri, chair of the UN's Intergovernmental Panel on Climate Change and a close adviser to the Indian government.

Research Centre for Sustainable Development China: An institute of the Chinese Academy of Social Sciences. Dr Jiahua Pan, its director, is one of 12 members of the Chinese Experts Committee for Climate Change.

Wuppertal Institute for Climate, Energy and Environment Germany: Wuppertal Institute's ground-breaking climate change work is highly regarded both within and outside Germany.

Vitae Civilis Institute Brazil: Dr Rubens Born, Vitae Civilis's director, is one of Brazil's foremost commentators on climate change policy and has had significant input into the government's recent climate change plan.

International Centre for Energy, Environment and Development Nigeria: ICEED has expertise in climate change and energy policy. Dr Ewah Eleri, its director, is the author of Nigeria's renewable energy strategy.

The Climate Institute Australia: Set up in 2005, the Institute is a leading voice in climate research and advocacy, pioneering clean technology and investment solutions with government and business.

IMBEWU Sustainability Legal Specialists South Africa: An influential Johannesburg-based legal consultancy specialising in climate change law, whose director is Andrew Gilder.

Our patrons are Dr Rajendra Pachauri, chair of the Intergovernmental Panel on Climate Change and The Energy and Resources Institute's director, John Podesta, director of Center for American Progress and Lord Chris Patten of Barnes, former European Commissioner for External Affairs.

Contents

About the authors

Simon Retallack is Associate Director and Head of Climate Change at ippr. He leads ippr's influential programme of research, events and advocacy on UK and international climate change policy, and founded the Global Climate Network. Previously, Simon led research for the International Climate Change Taskforce, was co-director of the Climate Initiatives Fund and Commissioning Editor of *The Ecologist*.

Andrew Pendleton is a Senior Research Fellow at ippr and leads the Secretariat of the Global Climate Network. Andrew is a Sony Award-winning broadcast journalist and worked as a producer on BBC Radio 2's Jimmy Young Programme. Prior to joining ippr, Andrew led climate change policy work at Christian Aid, the UK churches' development agency. He has also worked on trade and globalisation, as well as corporate social responsibility.

David Nash is a Researcher at ippr where he helps coordinate the Global Climate Network. David joined ippr in April 2009, having previously interned at the Fabian Society. He holds an MA with distinction in Contemporary European Studies ('Euromasters') from the University of Bath and the Institut d'Etudes Politiques de Paris (Sciences-Po), and a BA Honours degree in French and History from the University of Warwick.

Acknowledgements

We would like to thank the Environment Agency for England and Wales for making this report possible and members of the Global Climate Network for their ongoing guidance and support.

Introduction

The purpose of this paper is to survey the current international climate negotiations and to outline the areas that may be of material interest to national environmental regulators ahead of December's United Nations Conference on Climate Change in Copenhagen.

Taken together, environmental regulators represent a heterogeneous grouping: they are of diverse institutional character and have very different statutory roles and responsibilities, in line with their domestic contexts and according to national environmental priorities.

Whether acting as part of the executive branch of government or semi-independent agencies with legislative authority to perform governmental functions, regulators have collectively witnessed an expansion in their remit as climate change has moved up the political agenda. The implementation of a post-2012 global climate change agreement is therefore likely to provide new and greater regulatory opportunities. These include opportunities relating to the implementation and evaluation of domestic mitigation policies and measures, overseeing projects under the Clean Development Mechanism (CDM), managing emissions trading schemes and undertaking climate adaptation planning – all of which will assume unprecedented international importance.

Furthermore, any substantive outcome from Copenhagen is likely to have implications for national regulators as governments are required to measure, report and enable verification of those factors that pertain to what has been agreed. This paper will analyse in detail the Bali Action Plan's (BAP) call for *measurable, reportable and verifiable* (MRV) mitigation commitments, actions and support and what this concept might mean for the work of environmental regulators.

While the debate on MRV is ongoing and the agreed framework and mechanisms for MRV remain inconclusive, comprehensive measuring and reporting of greenhouse gas emissions will be necessary if Parties to the United Nations Framework Convention on Climate Change (UNFCCC) are to convince each other that their mitigation efforts are accountable and comparable, in line with the principle of 'common but differentiated responsibilities and respective capabilities' enshrined in the UNFCCC. MRV can also build recognition of non-credited national mitigation actions, provide a means to assess the effectiveness of policies and measures, measure Parties' progress against the objectives of the Convention, and identify areas for future mitigation potential (Ellis and Moarif 2009).

Despite the fact that country data on greenhouse gas mitigation emanates from national-level processes and institutions, the role of national regulatory authorities in MRV has received surprisingly little attention in the literature. This paper will suggest that domestic regulators, in their contribution to the implementation, monitoring and oversight of mitigation activities, can help build consensus in the current negotiations by leading on MRV from the bottom up. It will also suggest that their work can set a benchmark for future international regulatory action on climate change and, crucially, help engender much needed trust and cooperation in a post-2012 global climate regime.

1. The UN climate negotiations: implications for environmental regulators

The prospects of national governments coming to an agreement on an effective and equitable approach to stem growth in global greenhouse gas emissions depend in large part on whether common ground can be struck on a number of critical and interrelated issues. These can be broadly defined as mitigation, adaptation and the provision of support for climate action in developing countries through sustained flows of finance, technology development and transfer, and capacity-building measures.

The Bali Action Plan (BAP) was adopted by Parties to the UNFCCC in December 2007 and is designed to map out the contours of the climate negotiations over a two-year period, in order to facilitate eventual implementation of an international framework acceptable to all actors. It sets out in detail and with clarity the areas under which meaningful consensus is deemed crucial if the talks are to be successful and future global cooperation secured.

Despite substantial variations in the functions and responsibilities of national environmental regulators, each has an important and in many cases expanding role in climate change policy (see Box 1, p7). While the areas under negotiation will vary in importance for regulators from country to country, it is possible to discern a number of key themes in the BAP that are of common interest to all. These include:

Shared vision for long-term cooperative action: The BAP calls for long-term cooperative action, including a 'long-term global goal for emissions reductions', in order to achieve the ultimate objective of the Convention in accordance with its provisions and principles. The shared vision acknowledges that 'the warming of the climate system is unequivocal' and that cooperative action to address climate change must be grounded in the latest scientific evidence. The findings of the Fourth Assessment report of the UN Intergovernmental Panel on Climate Change (IPCC 2007) conclude that global emissions need to peak rapidly and then fall sharply within two decades if atmospheric concentrations are to be stabilised at 450ppm (parts per million) carbon dioxide (CO_2) equivalent and average global temperature rise is to be limited to 2°C.

Mitigation: Article 1(b) of the BAP calls for enhanced national and international mitigation of greenhouse gas emissions, in the form of comparable mitigation commitments and actions (binding and quantified economy-wide emissions reduction obligations) by developed countries[1] and 'nationally appropriate mitigation actions' (NAMAs) by developing countries 'in the context of sustainable development'. It also reaffirms the principle that developing countries' actions should be supported by finance, technology and capacity-building measures.

Adaptation: Enhanced action on adaptation including international cooperation and support is called for in Article 1(c) of the BAP. In developing countries, where the effects of climate change are increasingly visible, governments will require assistance to develop and implement climate response strategies, vulnerability assessments, disaster

[1] According to the IPCC, emissions from developed countries must fall by 25-40 per cent by 2020 in relation to 1990 levels to limit global warming. This target could be met by additional mitigation policies and actions, including non-crediting unilateral measures and sectoral initiatives. Yet, owing to domestic political barriers to enacting climate change legislation (and demands in many Annex-1 countries for developing countries to take on targets also), many developed countries have been unreceptive to adopting the recommended commitments.

reduction strategies and means to address loss and damage as a result of climate change-related natural events. Resources – financial and technical – will be critical in order to meet these objectives.

Reducing emissions from deforestation and forest degradation in developing countries (REDD): Article 1(b)(iii) of the BAP calls for 'policy approaches and policy incentives' for REDD, with a number of Parties – such as Norway, in line with the G77 and China proposal – calling for the establishment of financial mechanisms to credit emissions reductions in the forestry sector. An increase in technical capacity and financial assistance to help develop forest carbon stocks and promote sustainable forestry will also be necessary.

Implementation: Although the Convention is legally binding, only signatories of the Kyoto Protocol are currently subject to quantified emissions commitments. If new quantification is agreed and extended to other countries at Copenhagen, this would need to be incorporated into the Convention, either as an amendment to the Kyoto Protocol or as a set of new decisions (McMahon and Moncel 2009)[2]. Implementing the Convention will have implications for international verification and compliance procedures. At the domestic level, it will impact on the choice of regulatory instruments used by governments to achieve agreed commitments and actions for mitigation and adaptation.

Clearly, each of these issues is of significant material interest to environmental regulators in a number of ways and according to their respective domestic circumstances and mandates.[3] However, one specific component of the BAP will be crucial to the credibility and successful implementation of a post-2012 global climate strategy (Fransen 2009, Winkler 2008), and stands out as central to the current work of environmental regulators and an area in which they can add further significant value. This is the monitoring, reporting and evaluation of measures, policies and programmes to mitigate the impact of climate change.

[2] Australia, for instance, has called for a single new protocol which would unify action under the Convention and build on the Kyoto Protocol (cf. TWN 2009b)

[3] It is worth pointing out that decisions pertaining to financing are unlikely to affect directly the work of regulators, since they naturally fall under the remits of national treasuries and international development ministries. However, regulators might be indirectly affected by decisions on finance and they might be required to evaluate financial support and its impact on policies and measures. Financing remains a heavily contested area under negotiation, with little progress to date in terms of deciding on financial packages, channels and mechanisms to support mitigation and adaptation efforts of developing countries.

Box 1: Environmental regulators: functions and responsibilities

Environmental regulators have vastly differing statutory roles and responsibilities, in line with their respective domestic contexts. Taken together, they are typically responsible for the regulation of a raft of domestic environmental policies, measures and standards, including inter alia: air quality control, waste management, standards and safeguards for pollutants and hazardous chemicals, land use and forestry, resource conservation, pesticide control, water quality and flood and coastal risk management.

The process of regulation typically involves four interlocking phases: defining outcomes, establishing the choice of regulatory instruments (direct regulation or alternative approaches), undertaking compliance assessment and enforcement, and providing evaluation and technical assistance (Environment Agency 2003). In countries with federal levels of governance, regulators provide guidance and direction for regional agencies and local authorities in implementing environmental regulation. For instance, through its Climate and Energy State and Local Program the United States Environmental Protection Agency (EPA) assists state and local governments in clean energy regulation by providing technical assistance and outreach support. Others, such as the Environment Agency for England and Wales and the Ministerio de Medio Ambiente in Spain, work closely with national counterparts at the transnational level to share technical information and regulatory experience, through for example the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL).

In terms of climate change policy, regulators have generally witnessed an expanding role in mitigation and adaptation and in some countries new ministries have been established for the sole purpose of regulating on climate change. Approaches adopted to reduce emissions have included traditional regulation, such as mandated standards on energy efficiency, carbon pricing (through a carbon tax or market based cap and trade scheme) and the provision of financial incentives (implementation of feed-in tariffs, direct subsidies or RD&D). For instance, the Australian Department of Energy and Climate Change delivers the majority of programmes under the Government's climate change strategy, including the Renewable Energy target and Solar Flagships programme, and will regulate the Carbon Pollution Reduction Scheme if implemented in 2011.

In China the National Development and Reform Commission (NDRC) implements and overseas an array of domestic policies and programmes including the 'Thousand Enterprises' scheme which regulates energy intensity in the industrial sector (Fei *et al* 2009: 18), while the Brazilian Department of Climate Change and Environmental Quality (SMCQ) is responsible for formulating the Government's National Policy Plan on Climate Change (Russar 2008). Others, such as the EPA are legally mandated under the US Clean Air Act to draw up regulation to limit future greenhouse gas emissions from vehicles, aircraft, marine vessels and stationary sources (Chettiar and Schwartz 2009). The Swedish Naturvårdsverket is responsible for the implementation and oversight of 16 environmental quality objectives including the Reduced Climate Impact, which entails the evaluation of existing and proposed new climate measures, and the collating of data on greenhouse gas emissions. The Indonesian Ministry of Environment collaborates with the ministries of forests and agriculture to regulate emissions in the land and forestry sectors.

Some regulatory bodies are involved in market regulation in the form of emissions trading or cap and trade programmes. For example, the Environment Agency in England and Wales and the Swedish Naturvårdsverket both supervise and review domestic industry reporting under phase two of the European Union Emissions Trading Scheme (EU ETS). It is reported that the Environment Agency regulates approximately 45 per cent of the UK's greenhouse gas emissions under the EU ETS (Environment Agency 2008).

Several regulators are responsible for measuring and reporting of GHG emissions in line with international requirements. The South African Department for Environmental Affairs, US EPA, Swedish Naturvårdsverket, and Algerian Ministère de l'Aménagement du Territoire, de l'Environnement at du Tourisme have all prepared their respective country's national communication and greenhouse gas inventories. The Polish Department of Climate Change and Atmospheric Projection monitors and oversees the Polish government's accounts under the Kyoto Protocol and is therefore subject to designated compliance procedures for emission trading, Joint implementation (JI) and Clean Development Mechanism (CDM) projects.

2. Measurement, reporting and verification in the international climate regime

a) MRV defined: meaning and objectives

The text of the Bali Action Plan introduces the principle of 'measurable, reportable and verifiable' (MRV) mitigation commitments, actions and support into the climate negotiations and, implicitly, the implementation of a post-2012 agreement (see Box 2). According to Taryn Fransen, Hilary McMahon and Smita Nakhooda (2008: 2), the inclusion of MRV was critical to reaching agreement over the Bali Roadmap and deciding how that concept is reflected in practice will have significant implications for the effectiveness and integrity of the future international climate regime.

Box 2: MRV and the Bali Action Plan

Article 1(b) of the Bali Action Plan calls for 'enhanced national/international action on mitigation of climate change, including, inter alia, consideration of:

(i) '*Measurable, reportable and verifiable* nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives, by all developed country Parties, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances;

(ii) 'Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a *measurable, reportable and verifiable* manner.'

United Nations 2007a

While the BAP does not specifically define 'measurable, reportable and verifiable', their meanings can be derived from common usage, both in the context of climate change and in other international legal agreements (Breidenich and Bodansky 2009).

- *Measurable* refers to direct physical measurement or estimation according to a range of direct or indirect indicators, inferences and projections under a given methodology. In the context of greenhouse gas emissions, data can be inferred by multiplying activity data (for example, quantity of fuel burned) by an interrelated emissions factor (the quantity of greenhouse gas per unit activity) (Fransen 2009: 2). Certain factors lend themselves better to quantification, while others are perhaps more suited to qualitative metrics, such as measuring the impact of national policies, programmes and sectoral programmes.
- Ensuring that data is *reportable* enables other actors to assess activities, comparatively or as stand-alone initiatives. This depends not only on the accuracy and reliability of measurement but also whether data reporting is transparent and conforms to standardised or even common reporting format (Breidenich and Bodansky 2009). Reported data may include, inter alia, greenhouse gas mitigation inputs (e.g. establishment of energy efficiency standards), intermediate outputs (number of energy efficiency appliances installed) and, crucially, outcomes in relation to baseline data (Ellis and Moarif 2009).
- Finally, *verifiable* denotes reported data that is independently assessed for accuracy and reliability (Fransen 2009: 2). As a process, it is crucial to building confidence among parties in international agreements and helps inform – although generally remains independent of – legal decisions pertaining to compliance. In the European Union, a system of remote sensing which enables monitoring of cross-border flows of air pollutants in accordance with the Long-Range Transboundary Air Pollution

Convention is also used as a means to independently verify greenhouse gas emissions data, as reported by EU member states (Breidenich and Bodansky 2009).

Implementing a comprehensive MRV framework under the Convention will enable Parties and the UNFCCC to fulfil a number of important objectives.

Firstly and perhaps most obviously, accurate reporting and verification provides a framework for accountability. It enables the tracking of progress by states, both individually and collectively, and can help determine whether or not they are meeting their respective international obligations – whether in terms of commitments, actions or support. Such a system is crucial to building trust among parties and confidence in the objectives of the Convention (Breidenich and Bodansky 2009: 9).

Secondly, an integrated MRV system as envisaged by the BAP provides international recognition of the different actions – unilateral and supported – that individual states are pursuing. This is particularly important for developing countries, who are not expected to commit to binding economy-wide emissions reduction targets in the near future[4]. By calling for MRV of nationally appropriate mitigation actions (NAMAs) undertaken by developing countries –which include, for example, improving standards for energy efficiency in residential, commercial and transport sectors, increasing renewable energy use and regulating energy intensity in industry – the BAP sets out how developing countries can demonstrate to the international community the full extent of their unilateral and voluntary actions to address climate change (Breidenich and Bodansky 2009: 19).

Thirdly, MRV can also help facilitate implementation of low-carbon policies and actions at the national and local level by establishing baselines and helping to identify mitigation potentials and opportunities for improvement (Fransen *et al* 2008, MacFaul 2006). Generating a more timely and comprehensive picture of global, national or sectoral greenhouse gas emissions trends is also useful in enabling the UNFCCC to assess whether global action on greenhouse gas mitigation needs to be enhanced (Ellis and Moariff 2009: 9).

Finally, MRV can play a role in linking developing countries' actions with support by drawing attention to policies and programmes in need of improvement and which incur costs, thereby helping donor countries to better target, plan and execute financial and technical assistance (cf. Kim *et al* 2009). A transparent MRV framework may also promote best practice and 'facilitate information-sharing on mitigation options and their cost with and between countries' (Fransen 2009). The BAP implicitly suggests that support itself should be subject to MRV, as a means to ensure that it is truly additional to other developed countries pre-existing commitments.

b) Current MRV arrangements under the UNFCCC

While the phrase 'measurable, reportable and verifiable'/'MRV' was first coined at Bali, both the Convention and Kyoto Protocol contain measurement and reporting provisions for mitigation commitments and actions, undertaken by developed and developing countries respectively. Under the Convention, a dual system of national greenhouse gas

[4] Although several developing countries have indicated that they may consider doing so. For instance, South Korea has recently suggested that it will commit to a 2020 emissions reduction target, while South Africa has already committed to peaking its emissions by 2025. Indonesia has pledged to cut its emissions by 40 per cent by 2030 if it receives financial assistance to prevent rainforest logging.

inventories and national communications is required of developed and developing countries alike. However, they are subject to different requirements in terms of frequency and level of detail of reporting and degree of verification, according to the principle of common but differentiated responsibilities. Annex 1 countries who have signed up to Quantified Emissions Limitation and Reduction Objectives (QELROs) under the Kyoto Protocol are subject to more stringent monitoring and review procedures in order to determine compliance and to evaluate their use of 'flexible mechanisms', including emissions trading, Joint Implementation and the Clean Development Mechanism. The reporting and verification processes under the Convention and Kyoto Protocol are summarised in Box 3.

Box 3: Reporting arrangements under the UNFCCC and the Kyoto Protocol

All parties to the Convention are required to submit national greenhouse gas inventories and national communications (Article 12), according to different schedules and varying degrees of detail, in line with the principle of 'common but differentiated responsibilities and respective capabilities'.

Developed countries are required to submit annual inventories of greenhouse gas emissions and removals by sinks. The inventory acts as a quantifiable reporting mechanism which tracks national trends in emissions, in order to enable year on year in-depth appraisal of mitigation efforts across all sectors. Annex 1 parties must prepare their inventories in line with indicative IPCC methodologies and 'good practice guidance', which break down measurement across sectors according to tiers of complexity (Fransen 2009). For reporting purposes, they are required to submit data in the form of a standardised National Inventory Report (NIR) which utilises a Common Reporting Format (CRF) set by the UNFCCC in order to facilitate analysis of data and provide for comparability (Breidenich and Bodansky 2009).

In terms of verification, Annex 1 countries are subject to a three-part review process involving the Secretariat and an expert review team which assess the application of IPCC guidelines and the methodologies used. The expert review team can recommend alterations if methodologies used are found to be inconsistent with IPCC guidelines and can also suggest areas for improvement (Fransen 2009).

Developing countries are also required to prepare inventories, but far less frequently than Annex 1 countries, with fewer compulsory data fields and no compulsory reporting standards. While most developing countries adopt IPCC methodologies, they are not required to do so. Moreover, non-Annex 1 inventories are not subject to independent review (Breidenich and Bodansky 2009).

Both developed and developing countries are also required to submit periodic national communications, which are designed to provide qualitative information on a broad range of climate-change-related activities that individual countries are undertaking towards implementing the Convention. These include unilateral mitigation policies and measures, sectoral schemes, support, adaptation measures, and research and development (R&D) into low-carbon technologies. As with the inventory process, Annex 1 countries are required to report a standardised set of information for each activity and their communications are subject to an 'in-depth review'. In contrast, non-Annex 1 countries submit national communications alongside their inventory and are asked only to report generally on programs and policies involving mitigation activities (Fransen 2009). Least developed countries are invited to submit national communications at their discretion.

In line with the 2005 Marrakech Accords, signatories of the Kyoto Protocol are subject to additional reporting requirements and review processes. This is necessary to assess compliance with their respective Quantified Emissions Limitation and Reduction Objectives (QELROs) and monitor authorised usage of Kyoto's offsetting provisions, namely emissions trading, JI and the CDM. Countries are required to establish a national system to estimate emissions and removals by sinks according to specified quantification methodologies. They

must also establish and update a national registry which monitors holdings and transactions of the various 'Kyoto units': Assigned Amount units (AAUs), Emission Reduction Units (ERUs), Certified Emission Reductions (CERs) and Removal Units (RMUs) (Fransen 2009). Parties' registries are electronically linked up to a centralised Independent Transaction Log (ITL) operated by the secretariat, which allows for 'real time' accounting and verification (Breidenich and Bodansky 2009).

Annex 1 Parties are also required to submit an annual report detailing holdings and tracking of Kyoto emissions units for independent third-party validation and review. They are subject to one in-country visit per commitment period and, in the event of problems with verification, the Expert Review Team can refer a Party to the Protocol's Compliance Committee.

A separate CDM registry to manage and distribute project credits to national governments provides the mainstay of CDM reporting. The CDM also relies on independent auditors or Designated Operational Entities (DOEs) to support the CDM Executive Board in assessing initial project eligibility, checking for additionality, ensuring use of agreed measurement standards, and determining end performance. Verification is financed by project participants, who 'cede a fraction of their credits to cover the CDM's administrative costs' (Breidenich and Bodansky 2009).

Most commentators are in agreement that a post-2012 MRV structure should logically build on the existing national communication and inventory systems (Fransen 2009, South Center 2008, Winkler 2008). According to Fransen (2009: 5) the current procedures under the Convention for Annex 1 countries provide for robust verification and review, 'especially in comparison to those of other international environmental agreements.' However, several shortfalls have been identified by developed and developing country Parties alike, including; the degree of accuracy of 'lower tier' IPCC methodologies which use default emissions factors to calculate data (and therefore may not accurately reflect national circumstances), the availability of data from certain sources and the lack of reviewer capacity in the UNFCCC, which limits the comprehensiveness of desk review and the occurrence of country visits. Furthermore, the current provisions for reporting by non-Annex 1 countries and in particular the system of national communications 'does not allow sufficient recognition of mitigation actions taken by developing countries' (McMahon and Moncel 2009: 8).

Consequently, the implementation of a new MRV framework if agreed is likely to derive from building on existing provisions to be complemented by new processes with 'a level of specificity and significance beyond previous obligations' (Fransen 2009: 17/1). Yet there is much debate on what this would entail exactly, and as a result the finer operational details of a future MRV system remain unclear. In a future agreement, there are likely to be 'more frequent and detailed reporting and verification processes' (Fransen 2009: 16). Crucially, this may include application of the current Annex 1 inventory process and Kyoto accounting provisions to all developed countries (including the USA) and more frequent and detailed reporting requirements for developing countries (ibid). According to Hilary McMahon and Remi Moncel (2009: 4), questions pertaining to how the operational structure will work are both 'politically sensitive and technically challenging.' It is perhaps unsurprising, therefore, that Parties' submissions to the UNFCCC on MRV to date have unveiled areas of convergence and significant divergence concerning the overriding principles and implementation of MRV.

c) Parties' submissions on MRV

A number of pressing and unresolved issues at the centre of a post-2012 MRV regime have been subject to sustained debate in recent periods of negotiation. They cover

issues pertaining inter alia to the practicalities and differentiation of measurement and reporting, the institutional arrangements governing reporting and verification, and the principles and mechanisms for determining access to financing and technical support. Submissions to the UNFCCC as of August 2009 have been usefully collated and summarised in a recent WRI Working Paper (2009).

Measuring different obligations and actions

Many countries raise in broad terms the types of obligations and actions which could be eligible for MRV and several proposals for streamlining these actions. As Annex 1 countries' reporting of economy-wide mitigation commitments is already subject to relatively stringent and standardised MRV processes (Ellis and Larsen 2008), much of the onus in recent proposals on MRV has been on the types of non-binding actions carried out, in particular by developing countries. Some developing states, including South Korea and Indonesia, acknowledge the importance of MRV for the implementation of developing country NAMAs, while Mexico has called for quantified 'MRVing' of national emissions 'as a way to show real reductions' (WRI 2009: 13). For several developed countries, such as the USA, the MRV of all developing countries mitigation actions is necessary if they are to be 'recognised' (WRI: 8). Developing countries such as South Africa have suggested that 'support for developing country NAMAs should be commensurate with the level of ambition and accountability for implementation of the proposed actions' (Fransen *et al* 2008: 8).

Reporting arrangements

Several states have proposed new institutional reporting arrangements that would complement the framework Convention. For instance, South Korea, South Africa and Brazil have all called for the establishment of a registry for recognising mitigation commitments and actions at the international level and to facilitate the matching and implementation of NAMAs with financing, technology and capacity-building support. Certain non-Annex 1 countries, such as Algeria on behalf of the African Group, have suggested that only supported actions should be reported in a registry (WRI 2009: 2). On the other hand, some developed countries have proposed the inclusion of standardised NAMAs with common reporting formats in national greenhouse gas inventories, or in the case of Australia in 'national schedules' adopted as annexes to a new treaty (WRI 2009).

There is further divergence over the governance structure of a registry[5]: whether it should be a centralised body under the jurisdiction of the UNFCCC or a 'decentralised financial model' in which actions and support are reported and resources allocated by various actors and through different channels (McMahon and Moncel 2009).

The EU has suggested that a registry could serve the additional function of helping to formulate and review proposed 'low-carbon development strategies' (McMahon and Moncel 2009: 11). Such nationally appropriate climate action plans could enable developing countries in particular to better articulate their contributions to cut global emissions in line with national priorities and sustainable development policies, thus overcoming the 'recognition' shortcomings of the existing national communication format. It could also help them identify and prioritise areas for future mitigation

[5] The latest revised negotiating text includes a reference to an 'MRV Panel' to be created under the COP which 'shall be in charge of establishing methodologies for MRV, measuring, reporting and verifying mitigation actions and the support received, as required by paragraph 1(b)(ii) of decision 1/CP.13, and keeping records of mitigation… activities implemented by developing countries with their own resources.' (UN 2009: 166-7)

potential (Fransen 2009)[6]. However, it is not clear who should formulate these action plans, what should be included in them and whether or not they should be subject to review (McMahon and Moncel 2009).

Verification

Verification is a further contested issue. Opinions diverge as to whether differentiation should be made between verification of developed and developing countries actions and at what level (international or national) verification should take place. The US, Australia, Canada and Indonesia have all called for similar methods of international verification for all Parties, building on the Convention's 'in-depth review' process (McMahon and Moncel 2009). This contrasts with Brazil, China, India and South Africa who stress the need for a gradation approach along developed and developing country lines. Korea and New Zealand both call for stricter verification where actions are undertaken through carbon markets (WRI 2009).

While there is a certain level of convergence in favour of international verification according to agreed standards for supported actions, views differ as to whether unilateral policies and measures should be verified internationally (Ellis and Moarif 2009). While the US, Norway, New Zealand and Indonesia broadly support third-party verification of unilateral actions, India, for example, states that developing country NAMAs by definition 'do not include national actions by developing countries with their own resources and without external support' (WRI 2009: 9). China, uniquely, supports the idea that reporting and verification of developing country NAMAs – supported or otherwise – should be undertaken solely by 'national entities under the guidance of the UNFCCC' (WRI 2009: 2).

Although international verification is likely to be scaled up under a post-2012 framework, there is little indication in Parties' submissions as to the types of institutional structures that could be involved in the verification process. Norway has proposed an international expert review of inventories submitted by all Parties which would enhance existing review procedures, but gives no indication as to whether or not this would require the establishment of a new verifying institution under the aegis of the UNFCCC (WRI 2009).

MRV of support for developing countries' mitigation actions

The issue of MRV of support for developing countries mitigation actions is also subject to differences in opinion. In accordance with Article 1(b) (ii) of the BAP the G77 suggests that 'technical, financial and capacity building support should all be "MRV-ed" and developed country performance in this respect should be subject to reporting and international verification' (Fransen *et al* 2008: 8). Interestingly, Mexico has proposed a 'Green Fund' to which both developed and developing countries could contribute, and which would be subject to MRV (WRI 2009: 13). However, developed and developing countries are evenly split with regards to the question of non-UNFCCC funding as an appropriate source of finance, with the former in favour and the latter against (McMahon and Moncel 2009).

Finally, it is worth mentioning that the US submission states that the legal character of actions must be the same for all Parties. It also calls for a new economic profiling of Parties to the Convention, in line with its view that 'at least some developing countries

[6] Such an approach would build on existing Technology Needs Assessments (TNAs) which developing countries have submitted to the UNFCCC to help inform future 'low-carbon roadmaps' (McMahon and Moncel 2009).

(such as major emitters and emerging economies) should be taking the same kinds of mitigation actions as developed countries' (WRI 2009: 22).

d) Implications for environmental regulators

As the divergences of views outlined in Parties' submissions to the UNFCCC suggest, how a future MRV regime will play out in practice is still open to debate. Its future operationalisation will nonetheless have a number of significant implications for the roles and responsibilities of environmental regulators.

As stated above, monitoring and reporting mitigation commitments and actions may not always fall under the direct jurisdiction of environmental regulators per se: in many countries, the task of measuring, reporting and verification of mitigation actions is shared across government departments, and often includes third-party non-governmental reporting and review (Breidenich and Bodansky 2009). However, a post-2012 climate regime which embeds MRV as a core principle will present new challenges and opportunities for domestic regulators, including the following.

- The current urgency over the need to implement a post-2012 climate framework could open the door for new regulatory opportunities to limit greenhouse gas emissions by national governments, in line with their 'MRV-able' international obligations. For instance, if the draft Boxer-Kerry Bill is approved by the US Senate in its current form, it will require the US EPA to regulate emissions from stationary sources, including coal power plants, a provision which had previously been withdrawn from the Waxman-Markey House Bill (Goldenberg 2009). While the EPA may choose to pursue a mixture of mandatory control regulation and market based mechanisms such as a regulatory cap and trade scheme (Chettiar and Schwartz 2009), it is likely to have to undertake reporting and review of the scheme[7]. Similarly, the Environment Agency is due to implement and regulate the UK's Carbon Reduction Commitment (CRC) Energy Efficiency Scheme, which is set to begin in April 2010. It may well be that that ongoing evaluation of both of these schemes will need to be undertaken in accordance with MRV principles and obligations.

- In developed countries, the operationalisation of MRV may in some cases have implications for any existing international-level reporting and verification work carried out by regulators. For instance, if developed country Parties who are yet to ratify the Kyoto Protocol (i.e. the US) were required to adopt current Annex-1 reporting and review procedures and relevant Protocol accounting provisions under a post-2012 MRV system (Fransen 2009), this would imply the need to upscale existing reporting and verification procedures. Since the US EPA is responsible for developing the US annual greenhouse gas inventory, it would be accountable for failure to comply with new reporting provisions.

- For developing countries, the MRV of NAMAs is likely to present challenges and opportunities for domestic regulators, particular if NAMAs are to be evaluated at the international level as per the registry proposal. According to Fei Teng *et al* (2009: 6)

[7] If the Senate fails to pass the Bill, President Obama may alternatively implement an executive agreement to authorise the EPA to pursue traditional regulation under the Clean Air Act in order to meet international requirements. To this end, the EPA has recently proposed a targeted plan to regulate new or renovated industrial and commercial facilities which emit more than 250 tons of greenhouse gases (including utilities, energy-intensive manufacturing, and refineries) to use 'best available technologies' to reduce emissions (Chettiar and Schwartz: 2009).

current measuring, reporting and verification provisions for climate change related policies in China 'differ greatly by policy and program' and may include centralised or decentralised data collection and varying review processes, including spot-check inspection systems. Furthermore, many greenhouse gas reporting systems in China have only recently been introduced, meaning that it is too early for regulators to test their quality and the value of the data produced (ibid). In future, while regulators are likely to *measure* national mitigation actions according to different domestic structures and circumstances, *reporting* may need to incorporate a certain degree of domestic standardisation if actions are to be assessed for their effectiveness and recognised at the international level. In the meantime the measurement, reporting and verification of NAMAs is likely to follow a trial-and-error process in many countries.

- The streamlining of national data collection and reporting of greenhouse gas emission reduction programmes by regulators in developed and developing countries alike would also facilitate the preparation of greenhouse gas inventories and ensure compatibility with international requirements[8]. Australia's National Greenhouse and Energy Reporting Streamlining Protocol offers an example of a nationally consistent and integrated approach to reporting. It collates mandatory and voluntary data into an online reporting system and includes information on greenhouse gas emission reductions and projections, and energy production, consumption, savings and intensity indicators (Australian Government Department of Climate Change 2009). Developing countries in particular can enhance their ability to meet UNFCCC reporting requirements by rationalising and integrating existing national reporting systems for the various policies, programmes and measures that they are pursuing (Fei Teng *et al* 2009).

- The MRV of regional sectoral schemes may be transformed as emissions trading and crediting programmes become linked. Under the second phase of the EU ETS, emissions allowances have been designated as Kyoto units which are eligible for trading under the Kyoto Emissions Trading, CDM and JI projects. The EU ETS operates according to a legally-binding monitoring and reporting framework with specific accreditation standards (Ellis and Moarif 2009). But new linkages could mean that regulators responsible for emissions trading registries, such as the Swedish EPA and the Environment Agency for England and Wales, would need to be aware of Kyoto Protocol and CDM reporting and verification procedures and, where applicable, integrate them into their work.

- If agreement over an MRV design framework for REDD is reached at Copenhagen – including in relation to methodologies to calculate national reference levels, appropriate metrics and indicators to estimate deviations from baseline, and a common format to streamline REDD activity reporting – regulators will need to ensure that they have the tools at their disposal to meet MRV obligations and become REDD 'ready' (United Nations 2007b). The establishment of an international financing mechanism may provide assistance for the MRV of REDD activities, including emissions reductions from the prevention of deforestation and CO_2 sequestration from the enhancement of carbon pools and the building of new forests and tree cover. MRV of REDD will also help to ensure against additionality (Simula 2009).

[8] Fransen *et al* (2008) single out the 'Greenhouse Gas Protocol' accounting tool, which offers a means to quantify and manage greenhouse gas emissions according to consistent methodologies and standards, as a mechanism that can enable coherence in reporting at both the national and international levels.

As an integrated MRV regime becomes operational, the domestic regulation of greenhouse gas mitigation commitments, policies and measures and, concomitantly, the implementation, evaluation and review of these activities is likely to assume increased international significance. As such, domestic regulators are likely to be key enablers in linking MRV on the ground with the international agreement.

3. Compliance and enforcement: is there a role for regulators?

Clarity on different obligations, governance structures and supporting mechanisms for MRV will be crucial in informing the coming into force of a post-2012 compliance regime (McMahon and Moncel 2009). Generally speaking, existing MRV processes are independent of compliance mechanisms. However, in international agreements that accommodate compliance procedures, verification can play a 'preliminary role by providing the factual predicate for later legal determinations' (Breidenich and Bodansky 2009: 7).

While the Convention's ultimate aim is to ensure that Parties meet their emissions reduction obligations, its verification systems are primarily 'geared towards monitoring and facilitating Parties' implementation of the agreement, rather than enforcing compliance' (Tenner 2000: 153). Signatories to the Kyoto Protocol on the other hand are subject to stringent procedures to facilitate, promote and enforce compliance, so as to ensure that they meet their target commitments. The Kyoto Compliance Committee includes a 'facilitative branch' which provides advice, assistance and 'early warning' to Parties in the event that non-compliance with emissions targets or MRV procedures is anticipated, and an 'enforcement branch' that determines penalties for non-compliant Parties. Penalties may include forfeiting of assigned emissions amounts in future commitment periods, the deduction of existing allowances, or suspension from Kyoto emissions trading.

In certain quarters there have been calls to upgrade Kyoto compliance mechanisms for Annex 1 countries under the post-2012 climate regime. For instance, the NGO community has suggested in a recent report that current early warning systems are insufficient and should be appended with a bond insurance scheme. According to the scheme, Kyoto signatories would pay a levy at the beginning of a commitment period and depending on whether or not they are compliant with their targets and reporting requirements would either retain or lose the levy at the end of the period. All financial penalties and interest accumulated would support developing countries' adaptation measures (Meyer *et al* 2009). The same report also discusses the possibility of mobilising the facilitative branch of a new UN Compliance Committee to provide technical and financial advice to developing country Parties in the event that they experience problems in meeting the anticipated outcomes set out in their respective NAMAs.

What role might domestic regulators play in this process? While regulators may offer guidance and information to international compliance bodies, their direct institutional involvement in enforcement and compliance mechanisms at the international level may vary, according to their respective mandates and the involvement of independent third-party verification bodies. That said, environmental regulators will play a central role in enforcing compliance at the domestic level, among sources and industries regulated by domestic greenhouse gas mitigation programmes.

Arguably, the best means of ensuring compliance is through the establishment of adequate policy incentives. Many regulators are involved in the drawing up and implementation of national climate policies and may, de facto, design incentive schemes that are at the heart of domestic compliance systems. One example is the NDRC in China which has drawn up a scheme of tax incentives aimed at promoting less polluting vehicles as part of the government's 11th Five Year Plan (Fransen *et al* 2009). Similarly, the Indian Central Pollution Control Board grants regional and state regulators permission to implement incentive schemes to promote compliance with environmental obligations and emission standards. In 2001 the West Bengal Pollution Control Board launched a project to provide financial incentives to industries in order to 'facilitate fuel conversion from coal to oil or gas in small boilers and ceramic kilns'. 50 per cent of capital costs were reimbursed which in turn has led to 'a drastic reduction of emissions of particulate matter from these industrial units' (INECE 2008).

Domestic regulators also work together and share best practice on enforcement and compliance through the International Network for Environmental Compliance and Enforcement (INECE). Recently INECE has provided compliance assistance, spotted gaps in domestic enforcement regimes and raised awareness among small-scale industries about black carbon and the means to limit its emissions (INECE 2008). It also offers a valuable forum in which regulators might share experience of domestic greenhouse gas data analysis, reporting and verification procedures, and how these can be developed in accordance with international MRV requirements under the UNFCCC.

4. Building national capacity for measuring and reporting

Access to the resources, tools and technical expertise to measure, report and verify greenhouse gas emission reductions in all countries will be critical to the success of a future MRV regime. Yet, in many developing countries, there remains a significant shortage of regulatory capacity to effectively undertake measuring, reporting and verification of domestic policies and programs (Fei *et al* 2009, McMahon and Moncel 2009). This has in turn affected the quality of non-Annex 1 reporting on mitigation actions to the UNFCCC and, crucially, the ability for developing countries to gain recognition for domestic contributions to the global mitigation effort.

As of June 2009, 135 of 150 non-Annex 1 countries have submitted an initial greenhouse gas emissions inventory as part of their national communication, 10 have submitted a second, and 1 (Mexico) a third.[9] While this statistic suggests general conformity with UNFCCC reporting requirements, it does mask some of the broader problems experienced by non-Annex 1 countries in meeting them.

Firstly, many developing countries have experienced significant problems in terms of measuring greenhouse gas emissions. According to Fransen *et al* (2008) the preparation of inventories has been seriously hampered by the lack of available activity data to calculate greenhouse gas emissions baselines and trends in, for example, energy, forestry, land use and industrial sectors. Under REDD, specialised software is needed for remote sensing, change detection and land cover classification but it is costly and not available in many countries (United Nations 2008). In other sectors, where information has been collated it has not always been accurate, owing in part to lack of country-specific data. Instead, default emissions factors are used in lower-tier IPCC

[9] Cf. UNFCCC 'Submitted national communications from non-Annex I Parties' http://unfccc.int/national_reports/non-annex_i_natcom/submitted_natcom/items/653.php

methodologies but such metrics do not always accurately reflect national circumstances (Fransen *et al* 2008).

Secondly, compiling inventories and developing national communications is very resource-intensive (Ellis and Moarif: 2009: 12). Brazil's greenhouse gas inventory for its initial national communication 'involved 150 entities [including] research centres, NGOs, industry organisations and government institutions... and approximately 700 experts', while Malawi has reported that a 'huge increase in human capacity' is needed for it to develop future national communications (ibid). Others have pointed out the need for financial and technological support so as to enable 'continuous collection and archiving of data' (Fransen 2009: 5).

Financing is integral to building ongoing developing country capacity for measuring and reporting activities. Article 12 of the UNFCCC stipulates that Annex II countries must provide 'new and additional financial resources' to meet 'the agreed full costs' of developing countries' reporting obligations under the Convention (cf. B&B 2009). The costs of developing national communications have varied from country to country: thus, China's second national communication and inventory totalled US$3.6 million compared to a price tag of US$35,000 for preparing Costa Rica's submission (cf. Ellis and Moarif 2009).

Currently, international funding is channelled through the Global Environment Facility (GEF), which supports the drawing up of national communications (and greenhouse gas inventories) on a project basis. There are, however, two fundamental problems with the GEF system in its current design.

- Firstly, funding for developing country reporting is tied to the timing of submissions to the UNFCCC, meaning that it is very difficult for countries to develop and maintain continuous monitoring and reporting capacity (Breidenich and Bodansky 2009). In these circumstances, countries choose to sub-contract the preparation of inventories to foreign experts, as opposed to the option of investing in domestically-owned data collection and management processes. This ultimately prevents knowledge and capacity being passed on in support of future inventories (Fransen 2009).
- Secondly, GEF provides up to US$405,000 for each non-Annex I Party for the preparation of its national communication, and an additional US$15,000 per country for 'stocktaking exercises and stakeholder consultations in preparation of the project proposals'. Clearly, this is far from the amount needed to fund China's national communications for example (see above). Moreover, the fact that GEF alone determines the financial sums for reporting technically contravenes its obligation, set out in Article 4.3/CP.11, to provide '*agreed* full cost' funding. According to the South Center (2008), this has been a highly controversial issue in the negotiations on the issue of non-Annex I reporting under the Convention.

The lack of capacity for measuring and reporting of mitigation actions in non-Annex 1 countries not only stems from problems with funding but also from the nature of current international verification processes under the UNFCCC. Because developing countries' national communications are not subject to third party verification, these countries essentially miss out on the important capacity-building function an expert review brings: namely, providing feedback, guidance and ways to improve inventories according to best practice (Fransen 2009).

The Consultative Group of Experts (CGE), which is administered by the UNFCCC and has recently had its mandate renewed, offers non-Annex 1 countries technical advice and

support in the preparation of national communications. It also acts as an important forum for Parties to share their reporting experiences (TWN 2009a). However, in its current form, the CGE exists for the purpose of improving the preparation of national communications rather than reviewing submitted inventories (Breidenich and Bodansky 2009). Therefore, the extent to which it offers a critique of – and suggests improvements for – quantitative data collection processes is minimal.

In light of these problems, there remain significant challenges to be overcome if developing countries are to meet existing and any additional reporting requirements under a post-2012 MRV regime (Ellis and Moarif 2009). Without the capacity and technical resources to measure and report emissions reductions, developing countries will fail to gain recognition for existing unilateral mitigation measures or attract financial assistance for new policy initiatives.

Herein, domestic regulators can potentially add value. By working together in forums such as the INECE, regulators can share technical expertise on measurement, identify best practice for reporting, compare national-level processes for verification, analyse gaps in enforcement mechanisms, share experience of domestic incentive schemes for compliance, and suggest ways in which MRV can be built into existing domestic mitigation policy. All of this may help overcome part of the 'capacity deficit' currently experienced by regulators in developing countries. Such support may also implicitly help to build a degree of standardisation into NAMA reporting, which will be necessary if there is to be comparable MRV among developing countries and if they are to demonstrate progress in their mitigation activities according to the principles of the Convention.

Furthermore, regulators may offer bi-lateral assistance to counterparts in other countries to help them meet reporting costs and requirements. For instance, in 2006 the US EPA provided US$540,000 in co-funding to help Mexico prepare its third national communication. This money supported, inter alia, updates to the Mexican national inventory, acquisition of GIS inventory equipment, and a series of studies on adaptation, co-benefits and energy efficiency (Fransen 2009). Similarly, as part of Australia's International Forest Carbon Initiative, the Australian Department for Climate Change (which co-directs the initiative) has pledged AUS$10 million to support Indonesia's climate and forest policies and help it develop a National Forest Resource Information System, National Carbon Accounting System, and tools and mechanisms to supervise, manage and prevent large-scale forest fires (Australian Government 2009b). The Australian government has also installed a ground receiving station in northern Australia to provide Indonesia and other neighbouring countries with remote sensing and satellite data to enable MRV-able activities under REDD[10].

Conclusions

Whatever the material outcome of the Copenhagen Conference in December, the coming into force of a global strategy to address climate change beyond 2012 is likely to have broad implications for domestic environmental regulators. This discussion paper has suggested that one area under negotiation which will be crucial to the future work of

[10] Cf. Indonesia and Australia (2009) 'Reducing Emissions from Deforestation and Forest Degradation in Developing Countries', Joint Submission to the AWG-LCA and SBSTA. http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/indonesiaaustralia070809.pdf

regulators is ensuring that their government's mitigation commitments and actions are 'measurable, reportable and verifiable'.

As the debate on MRV unfolds and details of its operation and structures come to light, so the ways in which regulatory authorities will be implicated in a post-2012 MRV regime will become clearer. Any involvement they may have in MRV processes is likely to differ from regulator to regulator, in line with their domestic mandates and according to differing mitigations activities required of their governments. By outlining potential areas of interest, this discussion paper sets the scene for sustained dialogue between regulators, so that they can better understand the opportunities facing them in a future international climate framework.

Taryn Fransen (2009: 3) has suggested that the process of measuring and reporting on climate change mitigation and support could 'catalyze coordination and planning both within and between countries' to assess climate goals, identify future mitigation potential and measure progress towards implementation of the Convention. The Global Climate Network has shown in this paper that we anticipate that the same coordination, sharing of experience, assistance and dialogue on best practice for the implementation, reporting and review of domestic policies and measures should take place between domestic regulators if those objectives are to be attained.

By working together, regulatory authorities can help overcome capacity problems for reporting in developing countries, enable increased recognition of unilateral mitigation actions at the international level and, ultimately, contribute to developing a bottom-up system of equitable global climate regulation. Through their involvement in the supervision, evaluation and review of domestic mitigation policies and measures, environmental regulators can add significant value to the MRV process. With that in mind, they are likely to be key institutions at the front and centre in helping to build trust and confidence among actors in a post-2012 international climate regime.

References

Australian Government Department of Climate Change (2009a) *Streamlining Greenhouse and Energy Reporting*. Canberra: Australian Government: June 2009 http://www.climatechange.gov.au/reporting/publications/pubs/streamlining-fact-sheet.pdf

Australian Government Department of Climate Change (2009b) *International Forest Carbon Initiative*. Canberra: Australian Government: March 2009 http://www.climatechange.gov.au/international/publications/pubs/ifci_factsheet_1.pdf

Breidenich C and Bodansky D (2009) *Measurement, Reporting and Verification in a post-2012 Climate Agreement*. Arlington, VA: Pew Center on Global Climate Change.

Chettiar I and Schwartz J (2009) *The Road Ahead: EPA's Options and Obligations for Regulating Greenhouse Gases*. Report Number 3. New York: Institute for Policy Integrity/New York University School of Law

Ellis J and Moarif S (2009) *GHG Mitigation Actions: MRV issues and Options*. Paris: OECD

Ellis J and Larsen K (2008) *Measurement, Reporting and Verification of Mitigation Actions and Commitments*. Paris: OECD

Environment Agency (2008) *Limiting and Adapting to Climate Change*. Bristol: Environment Agency

Environment Agency (2003), *Delivering for the Environment: A 21st Century approach to regulation*. Bristol: Environment Agency

Fei T *et al* (2009) *Mitigation Actions in China: Measurement, Reporting and Verification.* WRI working paper. Washington DC: World Resources Institute

Fransen T (2009) *Enhancing Today's MRV Framework to Meet Tomorrow's Needs: The Role of National Communications and Inventories.* WRI Working Paper. Washington, DC: World Resources Institute

Fransen T, McMahon H and Nakhooda S (2008) *Measuring the Way to a New Global Climate Agreement. .* WRI Discussion Paper. Washington, DC: World Resources Institute.

Goldenberg S (2009) 'Democrats unveil ambitious draft climate change bill to the US Senate', *the Guardian*, http://www.guardian.co.uk/environment/2009/sep/30/climate-change-bill-senate

International Network for Environmental Compliance and Enforcement (INECE) (2008) 'Jump-starting climate protection: INECE targets compliance with laws controlling black carbon'. 12 June 2008 http://inece.org/climate/INECEClimateComplianceAlert_BlackCarbon.pdf

Kim JA, Corfee-Morlot J and T'Serclaes P (2009) *Linking Mitigation Actions in Developing Countries with Mitigation Support: A Conceptual Framework*. Paris: OECD

MacFaul L (2006) 'Developing the Climate Change Regime: The Role of Verification' in Avenhaus R *et al* (eds.) *Verifying Treaty Compliance*. Berlin: Springer*:* 171 – 209

Meyer A *et al* (2009) *A Copenhagen Climate Treaty: Version 1.0 – A Proposal for a Copenhagen Agreement by Members of the NGO Community*. Gland: WWF http://www.worldwildlife.org/climate/Publications/WWFBinaryitem13651.pdf

Russar J (2008) *Panoroma de Atores et Initiativas No Brasil Sobre Mundanças do Clima (Overview of Players and Initiatives on Climate Change in Brazil)*. Unpublished Paper. São Lourenço da Serra: Vitae Civilis

Simula M (2009) *REDD Finance Mechanisms*. TFD Background Paper (Draft for Discussion) http://unfccc.int/files/methods_science/redd/application/pdf/tfd-redd-finance-background-paper.pdf

South Centre (2008) *"Measurable, Reportable, and Verifiable": Using the UNFCCC's Existing MRV Mechanisms in the Context of the Ad Hoc Working Group on Long Term Cooperative Action under the Convention.* Geneva: South Centre

Tenner C (2000) 'Verification and Compliance Systems in the Climate Change Regime', in Findlay T (ed.) *Verification Yearbook 2000*. London: Vertic

Third World Network (TWN) (2009a) 'Consultative Group of Experts on National Communications reconstituted with limitations', 11 June 2009. http://www.twnside.org.sg/title2/climate/bonn.news.3.htm

Third World Network (TWN) (2009b) 'North proposes South's commitments in new climate treaties', 27 May 2009. http://www.twnside.org.sg/title2/climate/info.service/2009/climate.change.20090501.htm

United Nations (2008) 'REDD Workshop: Monitoring, Assessment and Verification'. Convened by the UN-REDD Programme. Washington DC: 16 -17 September 2008 http://www.unredd.org/portals/15/documents/events/20080917washington/WorkshopReport_Washington20080917.pdf

United Nations (2009) *Ad Hoc Working Group on Long-term cooperative action under the Convention*: *Revised Negotiating Text*. Sixth session: Bonn, 1–12 June 2009 http://unfccc.int/resource/docs/2009/awglca6/eng/inf01.pdf

United Nations (2007a) *Bali Action Plan: Decision 1/CP.13.* New York City. http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3

United Nations (2007b) *Reducing emissions from deforestation in developing countries: approaches to stimulate action: Decision 2/CP.13.* New York City. http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3

Winkler H (2008) 'Measurable, Reportable and Verifiable: the Keys to Mitigation in the Copenhagen Deal', *Climate Policy*, 8: 534-547

World Resources Institute (WRI) (2009) *Summary of UNFCCC Submissions*, WRI working paper. Washington DC: World Resources Institute