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A series of four concentric, curved green lines that sweep across the bottom half of the page, creating a sense of movement and depth. The lines are in varying shades of green, from a dark forest green to a lighter, sage green.

MEASUREMENT, REPORTING AND VERIFICATION OF MITIGATION ACTIONS AND COMMITMENTS

Jane Ellis (OECD) and Kate Larsen (IEA)
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The ideas expressed in this paper are those of the authors and do not necessarily represent the views of the OECD, the IEA, or their member countries, or the endorsement of any approach described herein.

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FOREWORD

This document was prepared by the OECD and IEA Secretariats in Autumn 2008 in response to the Annex I Expert Group on the United Nations Framework Convention on Climate Change (UNFCCC). The Annex I Expert Group oversees development of analytical papers for the purpose of providing useful and timely input to the climate change negotiations. These papers may also be useful to national policy-makers and other decision-makers. In a collaborative effort, authors work with the Annex I Expert Group to develop these papers. However, the papers do not necessarily represent the views of the OECD or the IEA, nor are they intended to prejudge the views of countries participating in the Annex I Expert Group. Rather, they are Secretariat information papers intended to inform Member countries, as well as the UNFCCC audience.

The Annex I Parties or countries referred to in this document are those listed in Annex I of the UNFCCC (as amended at the 3rd Conference of the Parties in December 1997): Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and United States of America. Korea and Mexico, as OECD member countries, also participate in the Annex I Expert Group. Where this document refers to “countries” or “governments”, it is also intended to include “regional economic organisations”, if appropriate.

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Executive Summary

A post-2012 climate agreement may well be more complex than the Kyoto Protocol, incorporating a wider range of GHG mitigation actions and commitments from a larger number of countries. The procedures for overseeing progress in the implementation of such post-2012 actions and commitments may also differ from those under the Kyoto Protocol. For example, the Bali Action Plan calls for enhanced mitigation activities to be “measurable, reportable, and verifiable” (MRV).

This paper explores what MRV could mean for mitigation commitments and actions and how current procedures would need to change in order to ensure that post-2012 actions and commitments are indeed “MRVable.” The Bali Action Plan also refers to MRV in the context of support for mitigation actions. However, exploring this issue is beyond the scope of this paper, as is an examination of any link between mitigation actions and support.

Annex I countries have gained considerable experience with monitoring and reporting under both the United Nations’ Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol (KP). This experience focuses on quantitative aspects (such as national emissions and trade in emissions credits) but also includes qualitative aspects (such as reporting on policies and measures, as well as on national systems for monitoring, tracking of emissions and quality control).

Current greenhouse gas (GHG) emission commitments under the Kyoto Protocol are based on quantified emission limitations and reduction objectives (QELROs). Monitoring, reporting and review of national GHG emission levels therefore form the backbone of reporting requirements under the KP. Current guidelines encompass what is to be monitored and reported (both qualitative and quantitative information), how it is to be monitored and reported and when. Annex I countries also have growing experience in monitoring and reporting changes in their accounted emissions by tracking transfers and acquisitions under the Kyoto Protocol’s flexibility mechanisms and with the creation and use of national systems to carry out these monitoring functions.

To what extent “monitoring” activities under the Kyoto Protocol can form the basis for “measurable” activities in a post-2012 climate regime will depend on how this latter term is defined. If it is defined for QELRO-based commitments as using quality-controlled data and IPCC approved methods to estimate GHG emissions, few modifications are likely to be needed to existing monitoring and reporting guidance under the KP and Marrakech Accords (other than to account for possible expansion of scope and/or coverage of such QELROs).

Similarly, the definition of “verifiable” in a post-2012 regime will determine the extent to which current guidance on, and experience with, activities related to “review” and verification can be built on in the future. Guidance on verification under the Marrakech Accords varies widely in terms of who undertakes the verification (e.g. self-verification or third-party review), and whether such verification is subsequently certified by UNFCCC processes.

At present, it is not clear what type of mitigation actions might be agreed for enhanced GHG mitigation action by developed and developing countries post-2012. It is also not clear whether MRV requirements will be similar, or not, between developed and developing countries. While the level and scope of mitigation actions may differ significantly between countries, many of the same issues could arise with enhanced efforts to measure, report and verify these actions.

Since current GHG commitments by developed countries do not focus on GHG mitigation actions (but on GHG emissions targets and on ensuring quality information and national systems to support the use of the Kyoto mechanisms to achieve these targets), it is unsurprising that monitoring and reporting of GHG mitigation actions has a correspondingly lower profile. Indeed, current monitoring and reporting does not

provide a complete or timely picture of mitigation actions (such as policies and measures and their effects): reporting requirements for Annex I Parties allows for irregular, non-comprehensive, and often non-quantified reports; non-Annex I Parties report only if they determine their own capacity is sufficient, which means that both inventory data and information on mitigation actions is patchy at best. Although many developing countries have outlined climate-specific policies in official national documents, there is no official UNFCCC “repository” for such information. As a result there are significant gaps that would need to be filled if mitigation actions taken by developed and developing countries were to be measured, reported and verified under the UNFCCC.

There can be different purposes of an MRV framework for mitigation actions, including to ensure that actions agreed upon are implemented in practice and contribute effectively to GHG mitigation. To more accurately assess progress in enhanced GHG mitigation, MRV of actions may occur at several different points and could focus on inputs, intermediate outcomes or GHG outcomes. For example, the fact that a policy to promote renewable energy has been established could be measured, reported and verified as could any subsequent increase in renewable energy capacity. The impact that this increased capacity has on GHG emissions could also be estimated, reported and verified.

However, not all individual GHG mitigation actions will result in direct, immediately-measurable emission reductions. Further, it may be difficult to quantify the impact of many actions (e.g. sustainable development policies and measures). In situations where the emission reductions cannot be measured directly or accurately, other indicators may be needed.

Consideration of what is “nationally appropriate” for mitigation actions may also determine the type and degree of MRV required. Parties exhibit a broad range of capacities and experience with monitoring and reporting national emissions, policies and measures. As many non-Annex I Parties have determined that their technical and institutional capacities were inadequate to meet existing guidelines, they may face challenges in meeting any additional requirements for MRV. Support in the form of technology, finance, and capacity building could help to fill this capacity gap.

This paper outlines that the Bali Action Plan’s language on “measurable, reportable and verifiable” is open to interpretation – not least because the terms themselves need to be defined. It is important to agree the purpose and scope of MRV of GHG mitigation actions within the near future in order to allow enough time for countries implement these decisions and to build any needed capacity before the end of 2012.

1. Introduction

The Bali Action Plan marked an important shift in the international climate change negotiations as both developed and developing countries agreed to take nationally appropriate mitigation actions to address the challenge of climate change.² This approach, which differs somewhat from past agreements including the Kyoto Protocol, upholds the basic principles of the UN Framework Convention on Climate Change yet acknowledges that the world has changed since the Convention was agreed in 1992. Building on progress made under the Bali Action Plan, many countries believe that a post-2012 agreement will need to reflect an evolution in countries' capabilities and responsibilities while providing the necessary flexibility to account for continued economic growth and development across the world.

A more comprehensive climate agreement that acknowledges a broad range of greenhouse gas (GHG) mitigation actions will benefit both developed and developing countries. Increasingly, developing countries are introducing national policies and measures to reduce GHG emissions and are establishing institutions capable of implementing these policies. However, developing countries receive little, if any, formal recognition for these actions within the existing international framework. Developed countries also have many policies and measures in place and under development to mitigate GHG emissions, and recognise the utility in accounting for different types and degrees of national mitigation actions in a way that allows for robust assessment.

A post-2012 climate agreement may well be more complex than the Kyoto Protocol, incorporating a wider range of actions and commitments from a shifting constellation of countries. Any such expansion could require a higher level of accountability for Parties that take on new actions or commitments. It could also lead to changed levels of accountability for countries if the type of any post-2012 action or commitment is different from that under the Kyoto Protocol. To accomplish this, the Bali Action Plan introduced the term "measurable, reportable, and verifiable" (MRV), both in the context of mitigation commitments and actions, and in the context of support for mitigation actions by developing countries.

There are many outstanding issues with respect to how to define and operationalise MRV. This paper addresses issues related to measuring, reporting and verifying quantitative mitigation commitments in developed countries, and other mitigation actions in both developed and developing countries. The paper considers how experience with ongoing efforts to monitor, report and review mitigation actions can shed light on how a future MRV framework will address commitments and actions agreed for the post-2012 timeframe. While GHG mitigation actions in developing countries and support of such actions may be linked, issues relating to a framework for measuring, reporting and verifying technology, finance and capacity building support, or on the link between mitigation actions and support for such actions, are beyond the scope of this paper.

1.1 Bali Action Plan Mitigation Commitments and Actions

Paragraphs 1 (b) (i) and (ii) of the Bali Action Plan (BAP) call 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 emissions limitations and reduction objectives, by all developed country Parties, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances;*

² The Bali Action Plan refers to "commitments or actions" for developed countries, and "actions" for developing countries.

- (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.*

This language was subject to intense negotiations and agreement hinged on the scope of issues to which “measurable, reportable and verifiable” refers. It is generally understood that these MRV requirements do indeed apply to both mitigation actions, by developed and developing countries, and to the provision of technology, financing and capacity-building (UNFCCC 2008). It is important to acknowledge, however, that the text leaves some room for interpretation, for example, of the extent to which mitigation actions by developing countries and support to undertake such actions are linked.

Box 1: What is “measurable, reportable and verifiable”?

The Bali Action Plan does not define “measurable, reportable and verifiable”. There are thus several open questions in this regard, including:

- Under the BAP, GHG mitigation actions need to be measurable. Does this mean the actions (and/or their effects) actually need to be measured³, or is monitoring sufficient? Should measuring/monitoring requirements vary by type of action/commitment?
- If actions (and/or their effects) need to be measured, should this be done in terms of inputs, intermediate outcomes or GHG outcomes? Can the GHG outcomes of GHG mitigation actions always be “measured”, or should/could some be “monitored”?
- How transparent and comparable should the reporting of different GHG mitigation actions be? Should there be standardised reporting requirements (e.g. for particular types of commitments or actions), or can similar actions undertaken in different countries be reported in different ways?
- How closely could/should a verification process under a post-2012 climate framework match the “review” process under the Kyoto Protocol and/or verification procedures under the Marrakech Accords?

Agreeing definitions for these terms is important, as they will determine the extent of changes needed post-2012 (compared to present systems for monitoring, reporting and review), and the resource and capacity requirements – as well as time - needed to implement such changes.

This paper addresses issues related to MRV in the following two mitigation categories:

- Quantified mitigation commitments, including quantified emissions limitations and reduction objectives (QELROs), for developed countries; and
- Other mitigation actions by both developed and developing countries.

These categories derive from the different nature of MRV activities necessary for quantitative commitments (most commonly in the form of QELROs) and other mitigation actions. There is considerable experience

³ Under the Kyoto Protocol, Annex I requirements are to “monitor” national GHG emissions via a national system which “should be designed and operated to ensure the quality of the inventory through planning, preparation and management of inventory activities. Inventory activities include collecting activity data, selecting methods and emission factors appropriately, estimating anthropogenic GHG emissions by sources and removals by sinks, implementing uncertainty assessment and quality assurance/quality control (QA/QC) activities, and carrying out procedures for the verification of the inventory data at the national level.” (UNFCCC 2001). “Measuring” (if understood as direct measurement of) GHG mitigation actions, e.g. is possible for some mitigation actions (e.g. CH₄ capture from landfills) but could be more onerous – or even impossible - for others (e.g. road pricing schemes).

with monitoring and review of QELROs to date, but much less with other mitigation commitments and/or actions, which could present a wider range of challenges for MRV. MRV requirements for non-QELRO commitments (e.g. a commitment to implement a particular policy) may be similar to those of non-QELRO actions. However, there may also be some differences – particularly in the frequency of reporting, and type and level of any verification needed. Nevertheless, this paper addresses all non-QELRO mitigation actions, for both developed and developing countries, as a single category.

Paragraph 1(b) (ii) of the BAP clearly indicates that developing countries will take on nationally appropriate mitigation actions, but leaves specification of the type and scope to be decided in future negotiations. While mitigation actions may differ between developed and developing countries, there could be some similarities in the MRV of actions that have not been measured, monitored or reviewed under the current framework. This paper addresses a range of possible actions drawn from existing developed and developing country climate change programmes, policies and measures.

The link between implementing mitigation actions in developing countries and the provision of support in the form of technology, financing and capacity building is an important issue. There are several different interpretations of paragraph 1(b)(ii) in this regard. One interpretation is that both developing country mitigation actions and provision of support will be subject to MRV, but with no explicit, conditional link between specific mitigation actions and targeted provision of support for such action. This would essentially allow developed countries to verify that they have met their commitments for mitigation support, but would not require developing countries to measure, report or verify that this support has resulted in GHG mitigation.

Another possible interpretation is that some developing country mitigation actions will be contingent upon receipt of direct support. An MRV system that directly links action to support could apply to all or only some developing country mitigation actions, cover all or a portion of their incremental cost, or apply only to those actions that are additional to “unilateral actions” taken to achieve national sustainable development and emissions objectives. A judgement of which interpretation is most appropriate will be made in future agreements, but is not necessary for the purposes of this paper. MRV issues that may arise under both scenarios are considered here.

The paper is organised as follows: Section 2 addresses the MRV issues specific to quantitative mitigation commitments for developed countries. Section 3 addresses other mitigation actions for developed and developing countries. It first discusses the possible range of mitigation actions, outlines existing monitoring and review guidelines, examines, the unique challenges of MRV for mitigation actions, and identifies gaps in the existing system. Section 4 provides some preliminary conclusions and issues for further consideration.

2. MRV of mitigation commitments in the form of QELROs

The Bali Action Plan indicates that, as part of enhanced action on climate change mitigation, commitments or actions by developed countries will be considered for the post-2012 framework. The Bali Action Plan specifically mentions “quantified emission limitation and reduction objectives” (QELROs) as part of this. One of the advantages of commitments in the form of QELROs is that a country’s absolute emission levels can be monitored, reported and verified (as they are under the Kyoto Protocol and UNFCCC), and thus allow countries to evaluate their progress towards any QELRO agreed.

MRV-related requirements for national-level QELROs may differ from MRV-related requirements for other commitments or actions. This is because a QELRO-based commitment focuses on GHG outcomes, whereas other types of commitments or actions may focus on inputs/processes, intermediate outcomes or non-GHG outcomes (e.g. implementing a policy, capacity of renewable electricity generation installed, provision of information, economic/financial incentives etc.). Further, commitments other than QELROs may take place at a sub-national level whereas existing QELROs have been established at national level.

This following section examines the MRV-related requirements of commitments in the form of QELROs⁴.

2.1 Existing MRV-related requirements for QELROs

At present, the only international GHG mitigation commitments in the form of QELROs are those laid out in Annex B of the Kyoto Protocol (and a proposed subsequent amendment). These QELROs define allowable emissions of the basket of gases covered by the Kyoto Protocol (CO₂, CH₄, N₂O, PFCs, HFCs and SF₆) in the 2008-12 timeframe.⁵ These allowable emissions are measured in terms of tonnes of CO₂-equivalent, and are called “assigned amount units” (AAUs). QELROs under the KP are established at the national level, and are generally based on emissions produced within a country’s borders⁶. Actual domestic emissions from Annex B countries can be higher than the initial level of AAUs if countries and/or companies acquire emission allowances/credits from other sources (e.g. bilateral exchange of AAUs, or credits from CDM or JI projects or via emissions trading). Thus, a country can be in compliance with its QELRO even if its domestic emissions are higher than its QELRO level, as long as part of these emissions are offset by domestic removals of CO₂e and/or net acquisitions of units (AAUs, CERs, ERUs or from emissions trading).

To ensure that QELRO commitments such as those under the KP are measurable, reportable and verifiable, information is required on a) emissions occurring within a country’s borders and b) any transfers, acquisitions or other changes of emission credits. In order to monitor and report information on a country’s domestic emissions, countries need to set up a “national system” for inventories. The Marrakech Accords (decision 20/CP.7) specify what such a national system should cover in Annex I Parties. This includes “all institutional, legal and procedural arrangements” necessary to establish a national inventory, quality control/assurance, and also covers reporting and archiving of inventory information⁷.

Information on domestic emissions and any adjustments for transfers or acquisitions or other changes in emissions credits can be used to assess whether a country is in compliance with its QELRO (see e.g. Figure 1). Depending on the provisions of an agreement, information on the levels of credit transfer/acquisition may also be needed separately (e.g. to determine “supplementarity”).

⁴ This section assumes that any QELROs are established at a national level. However, they could – at least in theory – also be established at other levels, e.g. sub-national or sectoral.

⁵ The Kyoto Protocol covers the major greenhouse gases. However, it does not include all GHG, e.g. those already covered by the Montreal Protocol on ozone-depleting substances.

⁶ However, transport-related emissions are calculated under the KP based on the amount of transport fuel sold within a country’s borders.

⁷ In order to be able to participate in the international carbon market, countries need to satisfy requirements relating to i.a. national systems, emissions inventories, national registries and supplementary information.

Box 2: National QELROs

Some countries have established independent national GHG mitigation objectives in the form of QELROs, in addition to – or in place of – commitments under the Kyoto Protocol. These QELROs may cover different gases, span over different timeframes, and/or be expressed in different ways than the QELROs laid out in the Kyoto Protocol. For example, the UK has set a “national goal” of reducing CO₂ emissions by 20 per cent below 1990 levels by 2010 and 60 per cent below by 2050 (HMG 2006). Australia has a national goal of reducing aggregate emissions by 60% by 2050 based on 2000 levels (AG 2008). The US has a national goal of reducing energy intensity by 18% between 2002 and 2012 (White House 2002).

There are no international MRV-related requirements for national GHG goals or targets, except when they reflect the country’s international commitments under the UNFCCC and KP. This is because the status of these national goals (e.g. aspirational goal, binding target) can vary depending on the national legal framework under which they are established. However, much of the same information is likely to be monitored, measured and reported as part of any international climate change target. Nevertheless, any verification or review provisions may differ significantly between a national and international QELRO, and indeed may also differ from country to country.

2.1.1 Establishing the national GHG inventory

A country’s national GHG inventory is the cornerstone of any MRV-related provisions for a QELRO-based commitment. There are detailed rules under the KP and Marrakech Accords on how domestic emissions in Annex I Parties should be monitored (or estimated), reported and reviewed. There are also rules on the “national system” that needs to be put in place in order to collect such information (decision 20/CP.7). While the requirements on “review” under the KP could differ significantly from requirements for verification (under a future climate framework), any parameter that is currently required to be “monitored” and “reported” under the KP could thus also be measured and reported under a post-2012 climate framework.

Annex I Parties are required to (“shall”) submit an annual inventory for all GHGs covered by the Kyoto Protocol, and to use the IPCC guidelines and good practice guidance when calculating this inventory (FCCC/SBSTA/2006/9).⁸ The guidance includes provisions on quality control and assurance, providing estimates of uncertainty levels, and how to calculate inventory adjustments in the event that inventories are incomplete or not consistent with IPCC guidance. As well as submitting the quantitative information in a national inventory in a “common reporting format”, countries are also required to submit a national inventory report that is to contain “detailed and complete” information on how their inventory was established. Current inventory reporting requirements thus encompass what is to be monitored/estimated and reported (both qualitative and quantitative information), how it is to be monitored/estimated and reported (e.g. summary tables, electronic submission, UN language) and when (annually, by 15 April for year N-2). Compliance with a country’s monitoring and reporting requirements as related to its national inventory system is required in order for a country to participate in the carbon market, and is determined by the enforcement branch of the Compliance Committee.

2.2 MRV guidelines for commitments in the form of QELROs

As outlined above, there are already many requirements for Annex I Parties relating to how to monitor and report national emissions as well as any other changes in emission levels brought about e.g. by emissions trading or participating in the project-based mechanisms. Any QELROs developed for a post-2012 framework could be similar to those under Kyoto (i.e. national level, based on emissions production).

⁸ The IPCC guidelines give countries the flexibility to use more or less-detailed methods to estimate emissions from a particular source depending on whether or not it is “key.” The IPCC guidelines also allow, under certain conditions, for national methods to calculate GHG emissions. New inventory guidelines were produced by the IPCC in 2006. Negotiations in 2009 will assess how these guidelines should be applied.

However, even if the basis for a QELRO were to be the same pre- and post-2012, some changes may be needed for post-2012 reporting requirements. For example:

- Scope: Recent analysis indicates that the KP does not include all GHG not covered by the Montreal Protocol, e.g. NF_3 (Forster et al 2007), and that some of the GHG covered could have effects that are larger or smaller than previously anticipated. If the scope of sources/gases covered by a QELRO changes, all countries taking on a QELRO would need to ensure that they would be able to measure, report and verify emissions of all new gases/sources;
- Verification provisions: The Kyoto Protocol and decisions taken subsequently outline provisions both to “review” and to “verify” various types of information, such as inventories, national communications and information exchange under the flexible mechanisms. In contrast, the Bali Action Plan refers to “verifiable” commitments or actions. Decisions will be needed on what such verification entails, and how similar it is to current provisions (e.g. with respect to who reviews/verifies, how this is done, and what any consequences of non-compliance with monitoring and reporting requirements are). The current climate framework uses “verify” in different ways, in particular regarding who would carry out any verification. For example, in the CDM, verification is carried out by accredited third-party auditors. However, in other parts of the Marrakech Accords verification is carried out by host country governments (JI), the UNFCCC Secretariat (International Transaction Log), or by unspecified type of “personnel” (quality assurance for national inventories)⁹.
- Country groupings: The list of “developed” countries for which a QELRO could be considered may be different from the list of countries with a QELRO under the KP (i.e. the Annex I Parties listed in Annex B of the Kyoto Protocol)¹⁰. Inventory requirements are less stringent in terms of timing, coverage and methodology for non-Annex I than for Annex I Parties. Thus any non-Annex I country that is subsequently labelled as a “developed” country in the post-2012 regime, or that independently agrees to take on a QELRO, may have to make significant improvements to its current national system of data collection and emission estimations.

It is also possible that any post-2012 QELROs could be established on a different basis to those under the KP. For example:

- The geographical scope of QELROs does not necessarily need to be established at the national level. Thus, it could be set for a group of countries (e.g. the EU) or alternatively at a sectoral or sub-national level. Changing the geographical scope at which a QELRO is set could also have implications for MRV. For example, if a QELRO is set to include several countries, decisions would be needed as to whether measurement, monitoring and reporting also be done at this level, or at national level. Setting QELROs at the sub-national level could be institutionally challenging, as sub-national governments are not Parties to either the Convention or the Protocol, but this may be avoided if the overall responsibility for MRV falls to national governments;

⁹ There are no general, agreed definitions of what “review” or “verify” mean in the current climate framework. Dictionary definitions of “review” encompass a range of actions, including “an inspection or examination for the purpose of evaluation” or “a critical evaluation”. Such a definition corresponds to practice under the UNFCCC and KP, where review occurs in different circumstances, e.g. to review inventories or national communications from Annex I countries. Under such reviews, the accuracy of the underlying data or information is not questioned; rather, its consistency (internal, with previous information, or with guidelines) is checked in order to provide a “thorough and comprehensive technical assessment”. In contrast, dictionary definitions of “verify” include “to establish the truth, accuracy or reality of” or “to prove the truth of by presentation of evidence or testimony”. In the current climate regime, “verification” is used in different contexts.

¹⁰ The notion of differentiating within non-Annex I countries is a contentious one, with developed and developing countries not agreeing on this issue.

- The coverage of QELROs could also be different post-2012. For example, sectoral emissions targets could be established, or sectors currently excluded from QELROs could be included (e.g. international marine or air transport). Such a revision would face challenges, e.g. obtaining comparable data for participating countries.

Box 3: Monitoring and reporting of emissions/removals from LULUCF

Reporting on GHG emissions or removals (CO₂ uptake) from land-use, land-use change and forestry (LULUCF) can be challenging: emissions from LULUCF can vary greatly according to national circumstances; large areas of land require monitoring; emissions from LULUCF can be influenced by a wide variety of activities and many different actors; uncertainties in both activity data and emission factors can be significant; and there may also be high inter-annual variability associated with biological processes.

Reporting requirements under the Kyoto Protocol are slightly different than under the Convention in order to be consistent with KP compliance provisions. The use of a common reporting format (CRF) for LULUCF under the KP is voluntary until the 2010 inventory submissions.

Annex I countries' reporting of annual GHG inventories must use the IPCC Good Practice Guidance for LULUCF (GPG for LULUCF) in 2005 and beyond (decision 13/CP.9). Non-Annex I countries are encouraged (but not required) to use the same guidance. Annex I Parties to the Kyoto Protocol shall also apply the GPG (decision 17/CMP.1). The GPG for LULUCF describes six broad land-use categories for reporting national inventories under the Convention: forest land, cropland, grassland, wetlands, settlements, and other land. Countries may use three different approaches for representing land area depending on the data available, ranging from the most commonly used land use datasets which have been gathered for other purposes such as forestry or agricultural statistics (Approach 1), to the more data intensive wall-to-wall mapping of the national territory (Approach 3). Countries may also use different tiers (Tiers 1-3) to calculate emissions, with higher tiers implying increased accuracy of the method and/or emissions factor and other parameters used. Tier 3 methods are costlier to implement and tailored to the specific ends of carbon measurement. As of 2006 inventories, Tier 3 methods are used by only nine Annex I countries to monitor CO₂ emissions where LULUCF is a key source (UNFCCC 2007).

Some assessments have shown that monitoring LULUCF emissions can be prone to a high level of uncertainty and the level of precision may vary depending on the LULUCF activity monitored. An expert analysis of the Austrian national inventory estimates the total uncertainty associated with forest carbon fluxes on the order of 35% (Winiwarter and Rypdal 2001). Canada reports large uncertainty with respect to deforestation rates, estimating a +/- 38% range of error for land area alone (GoC 2007). However, some countries have provided more precise estimates. Australia, which has a comprehensive LULUCF inventory and uses the most detailed methods to estimate emissions, reports an uncertainty related to land cover between 2 and 6%, uncertainty concerning carbon stock fluxes of 10% for forest conversion to cropland and grasslands (deforestation) and an uncertainty of 30% for carbon stock change in remaining forest (forest management) (AG 2008b).

Source: Bruno Guay, personal communication and Karousakis and Corfee-Morlot (2008)

If post-2012 QELROs are not established on a national basis, guidance on how to measure, monitor, report and verify such emissions could build on relevant guidance already established. For example, there is already significant non-UNFCCC guidance on how to monitor and report emissions at the entity and project level. This includes activities such as the WRI/WBCSD GHG protocol (WRI/WBCSD 2004), established to help companies quantify and report their emissions, and the follow-on protocol for accounting for emission reductions from projects (WRI/WBCSD 2005). The International Standards Organisation has also established relevant guidance, including "principles and requirements" for quantifying and reporting emissions at the organisational level (ISO 16064-1), and for quantifying, monitoring and reporting emission reduction or removal enhancement projects (ISO 16064-2). Experience with the Clean Development mechanism has also led to much experience with monitoring, reporting and verification of project-based emissions in some countries and sectors. Finally there is also relevant monitoring guidance available to monitor and report emissions at sub-national scale (e.g. state or provincial regions) (e.g. Climate Registry

2008) which could prove to be an important means to monitor how mitigation actions are advancing within a nation.

3. MRV of mitigation actions for developed and developing countries

The Bali Action Plan identifies the need for enhanced GHG mitigation “commitments or actions” by developed countries, and enhanced “actions” by developing countries. For developed countries, GHG commitments could be in the form of QELROs and/or other types of mitigation actions. Section 2 assessed MRV issues as they relate to commitments established in the form of QELROs.

This section explores MRV issues as they relate to other (non-QELRO) actions and commitments. For example, developed countries could commit to implementing policies and measures and/or to providing a particular level of support. Such commitments could thus take a similar form to “nationally appropriate mitigation action” undertaken by developing countries. This section therefore treats non-QELRO mitigation commitments and actions together.

The impact of some mitigation actions on emissions will be more difficult to measure than others – or would require other metrics than actual GHG emissions (e.g. Monni 2006). For example, some GHG mitigation actions have a direct effect (e.g. capturing CH₄ emissions from landfills), whereas others have an indirect effect (e.g. product labelling in order to change consumer behaviour). Further, the effect of GHG mitigation actions can be ascertained in the short term (e.g. when implementing GHG-friendly technologies) or in the longer term (e.g. when researching promising GHG-friendly technologies of the future). Future decisions about an MRV framework for GHG mitigation actions and non-QELRO-commitments may therefore need to include decisions as to what needs to be measured, reported and verified (i.e. GHG outcomes, intermediate outcomes, or inputs), when MRV is required, and who is to undertake it.

This section describes a range of possible mitigation actions that may be subject to MRV provisions under a future agreement, outlines existing MRV requirements as they relate to GHG mitigation actions, both for Annex I and non-Annex I Parties, and highlights revisions to current guidelines that would be needed to ensure that GHG mitigation actions are measured, reported and verified.

3.1 Possible Types of Mitigation Actions

A wide range of mitigation actions could be agreed upon for the post-2012 period. Some actions may be common to many or all countries, some may be specific to a region or group of countries and others may be unique to individual countries. Measuring, reporting and verifying these different types of actions will require some flexibility.

While it is not clear exactly what type of mitigation actions will be agreed, most potential actions can be grouped in broad categories that align with the range of policies and measures implemented to date. Parties may agree to take **regulatory** actions, those that take the form of standards or mandates, including sectoral targets or standards, energy efficiency standards, renewable energy or fuel mandates, other technology-specific mandates, or land-use management rules. Parties may commit to specific **research and development (R&D)** actions, including additional public funding, demonstration projects, or measures for technology deployment. Mitigation actions may also take the form of **financial or economic instruments**, such as taxes, financial incentives, loan guarantees, grants, or removal of adverse subsidies. Changes in a Party’s long-term efforts to facilitate long-term emission reductions may also be considered mitigation actions, including **institutional reform** and **education and outreach**.

Considering the wide range of possible mitigation actions that could be undertaken by a broad set of actors, allowing some form of aggregation, e.g. at the sector level, may facilitate agreement on what needs to be measured, reported and verified. For example, if mitigation actions are laid out in a comprehensive national climate plan, MRV of the effect of all or some of these could be done in aggregate. An example is China’s

National Climate Change Programme, which lays out emissions and efficiency targets and mitigation actions in specific sectors as well as institutional measures to improve implementation (NDRC 2007). Agreement on sector-specific mitigation actions may also have the potential to simplify the MRV process by narrowing consideration to the aggregate effect of mitigation actions within a specific sector or by allowing for common sector-specific actions across Parties (UNFCCC 2008, Baron et al 2008).

3.2 Existing MRV-related requirements for GHG mitigation actions

There are already MRV-related requirements for GHG mitigation actions for Parties under the UNFCCC and Kyoto Protocol. These requirements focus on monitoring, reporting and review (rather than on measurable, reportable and verifiable commitments or actions as in the Bali Action Plan).¹¹ These requirements include those relevant to measuring and reporting “commitments” (such as QELROs), as well as those relevant to monitoring and reporting other actions. This paper assumes that if a particular item is monitored and reported under the UNFCCC/KP, it is also likely to be “measurable” and “reportable” in a post-2012 regime.

Review (under current UNFCCC/KP provisions) could, however, be very different from verification (under a post-2012 regime). For example, review of Annex I Parties’ national communications is currently conducted by a small expert review team of peers from both developed and developing country Parties, co-ordinated by the Secretariat. The aim of this review is to conduct a thorough and comprehensive technical assessment. Such a review process may or may not be considered appropriate or sufficient for verification under the Bali Action Plan. The possible differences between the provisions for “review” and “verification” will need to be decided by future negotiations.

There are currently greater reporting requirements for Annex I than non-Annex I Parties, both in terms of the content of reporting and the frequency. These are outlined below.

3.2.1 MRV-related requirements for Annex I Parties

Existing guidance for Annex I Parties in the UNFCCC and Kyoto Protocol focuses on “monitoring” and “reporting” information, both qualitative and quantitative. Annex I Parties’ monitoring and reporting requirements (inasmuch as they pertain to mitigation actions) focus on:

1. Emissions inventories, which “shall” be submitted annually, include information by sector for all GHG including on LULUCF emissions/removals, and be elaborated using a country’s “national system” (for which there is also international guidance);
2. Supplementary information on emission reduction units (ERUs), certified emission reductions (CERs), assigned amount units (AAUs) and removal units (RMUs). For Parties that are eligible to participate in the Kyoto Mechanisms, information on the acquisition, transfer, retirement and cancellation of units “shall” also be reported annually – in conjunction with the emissions inventory; and
3. National communications, including information on policies and measures underway, as well as the expected effect of these policies and measures. These reports are also a requirement (but not annually).

These monitoring and reporting requirements under the UNFCCC and KP can provide the basis for measuring and reporting GHG mitigation actions implemented under the Bali Action Plan (UNFCCC 2008). However, because current KP commitments for Annex I Parties are established as a QELRO, monitoring and

¹¹ Neither the UNFCCC nor the Kyoto Protocol refer to the need to “verify”. However, the issue of verification is included in different areas of the Marrakech Accords – but is not always defined, and is used in different ways. See footnote 9 in section 2.2.

reporting requirements under the KP focus is on 1) information that is needed to determine whether a country is in compliance with its QELRO; and 2) whether parties are “eligible” to participate in the Kyoto mechanisms.

Current monitoring and reporting requirements do not, therefore, provide a complete or timely picture of GHG mitigation actions undertaken by Annex I Parties. This is because the actions underlying a country’s QELRO are seen only as a “means to an end”, i.e. as an input or an intermediate outcome. Since this end point (a country’s accounted emissions) is monitored, reported and reviewed, the individual steps a country takes towards this end are not. For example, although National Communications “shall” include information on policies and measures, not all policies and measures (PAMs) must be reported. Further, it is not obligatory to quantify the expected GHG mitigation effect of individual – or even clusters – of PAMs.¹² Although Annex I Parties “shall” provide a description of their national circumstances, providing information on how these are relevant to factors affecting GHG emissions and removals is not obligatory (“should”). Provision of information on funding research is also not obligatory, with guidelines indicating that only information on “highlights, innovations and significant efforts made” should be presented in national communications. This means that, at present, reporting of non-QELRO mitigation actions undertaken in Annex I Parties is:

- Irregular (most 4th National Communications were submitted late 2005/early 2006, and the 5th National Communications are not due until 2010);
- Not comprehensive (as countries are not required to report on every policy and measure, institutional improvement, R&D funding); and
- Often non-quantified (as quantification of the individual effects of policies and measures can be difficult, and is also not a requirement).

If some post-2012 commitments or actions by developed countries were at a disaggregated level (e.g. by sector, by policy type, and/or by gas), some changes in countries’ monitoring and reporting would be needed. In particular, MRV-related requirements on GHG mitigation actions such as individual policies and measures (or clusters of such PAMs) undertaken by developed countries would need to be strengthened in order to ensure that actions agreed under a post-2012 framework are indeed measured, reported and verified.

This could have resource implications at the national and international level as such a provision may require more extensive monitoring and reporting of agreed mitigation actions and their effects at the sub-national level. Care would also be needed to ensure that national and sub-national actions and their effects are not double-counted – not necessarily a straightforward task if different levels of government have overlapping jurisdictions. Disaggregating the level at which countries have GHG mitigation commitments could also increase the level of work required for verification, as many different actions will need to be verified (in contrast to a QELRO, where fewer items may need verification).

Both the UNFCCC and the Kyoto Protocol refer to the need for “review”. This includes review of the Protocol itself (Article 9), as well as review of items that are to be monitored and reported. While neither the UNFCCC nor the Kyoto Protocol uses the word “verify”, guidance agreed under the Marrakech Accords does – but in different ways in different contexts. This includes the CDM, where verification is defined as “periodic review and *ex post* determination” by an accredited third-party auditor. “Verify” is also used in other contexts, e.g. JI, where it is not defined, and where it is done by the host country; in emissions trading, where it is also not defined, and where verification is done by the International Transaction Log (maintained by the UNFCCC Secretariat); quality assurance procedures when establishing the national inventory, where it is also not defined, and carried out by “personnel not directly involved in inventory development”.

¹² However, it is obligatory (“shall”) for countries to make projections on a sectoral basis, and to quantify the aggregate effect of their policies and measures.

Current experience with verification does not therefore provide a single model or precedent for what verification could entail in a future climate regime. This is because the current use of verification varies in terms of whether it is independent/who undertakes it (e.g. national government, company, international organisation); where it is undertaken (i.e. in-country or not), and whether such verification is subsequently checked by another body.

3.2.2 MRV-related requirements for non-Annex I Parties

The Convention and Kyoto Protocol requirements related to monitoring, reporting and review of GHG mitigation activities in non-Annex I Parties are much less stringent than those for Annex I Parties. Current monitoring and reporting efforts take place primarily in the context of National Communication submissions. Participation in CDM projects, and associated transfers of CERs, is also reported on an on-going basis.

The current guidelines for non-Annex I National Communications were agreed at COP8 in 2002 (FCCC/CP/2002/7/Add.2)¹³. These guidelines repeat the Convention requirement that non-Annex I National Communications “shall” include a national inventory “to the extent its capacities permit”; general description of steps taken or envisaged to implement the Convention; and “any other information ... consider[ed] relevant.”¹⁴ The guidelines specify that initial national communications “shall” estimate emissions data “to the extent possible” for CO₂, CH₄ and N₂O for 1994 (use of the IPCC methods and good practice guidance is encouraged – “should” – but not required). The second national communication “shall” estimate an emissions inventory for 2000.¹⁵ Provision of emissions data on HFCs, PFCs and SF₆ is encouraged, but not required.

More than 130 non-Annex I Parties have provided emissions data in their initial National Communications. These data are mainly for emissions of CO₂, CH₄ and N₂O – although some sectors are more frequently reported (e.g. energy-related emissions) than others (e.g. emissions from agricultural soils) (UNFCCC 2005). The majority of countries report emissions for 1994, but several countries report for other years. Emissions for HFCs, PFCs and SF₆ are reported by only 18 countries.

Only 4 non-Annex I Parties (Argentina, Mexico, Korea and Uruguay) have submitted a second national communication with updated inventory data, and only one country (Mexico) has submitted a third.

Emissions inventory data for non-Annex I Parties is therefore patchy, both in terms of sectors/gases covered, and in terms of years for which there are data. More recent estimates for GHG emissions from developing countries exist (e.g. IEA, WRI-CAIT), however, though they may be based in part on official national statistics (e.g. for energy use) they are not official national GHG data. Given the way IPCC inventories are organised (i.e., by source and gas), official information on GHG emissions by sector is patchy.¹⁶ Most non-Annex I Parties indicate “their technical and institutional capacities were inadequate to meet their reporting

¹³ This decision indicates in paragraph 1a that the attached guidelines can be used for non-Annex I Parties who are preparing their initial, second or third national communications (NC) except if they had started preparing these communications before the guidelines were agreed. It also indicates in paragraph 1e that the guidelines can also be used for Parties who had already submitted their second NC and who have started their 3rd NC prior to COP13. Thus, for the large number of NAI countries producing a second national communication, guidelines for doing so are clear. However, it is not clear whether the current guidelines can be used for the production of countries’ third national communications.

¹⁴ This is in contrast to Annex I countries, where emissions inventories are summarised in national communications, but where full inventories need to be submitted annually.

¹⁵ These provisions do not apply to least developed countries, who “could estimate their national GHG inventories for years at their discretion”.

¹⁶ For example, if countries do not report on their emissions of fluorinated gases it is difficult to estimate total emissions from e.g. aluminium or magnesium production. Estimating a sector’s electricity-related emissions is also not possible, as emissions from electricity production are allocated to the producer, not consumer, of the electricity.

obligations under the Convention for both the preparation and updating of national GHG inventories” (UNFCCC 2005).

There are very few current requirements for non-Annex I Parties to provide information on their climate change mitigation measures. While the guidelines on National Communications states that each Party “shall” provide information on the “general descriptions of steps taken or envisaged for ... containing measures to mitigate climate change”, the provisions on policies and measures is much weaker. Thus, non-Annex I Parties are “encouraged to provide, to the extent their capacities allow, information on programmes and measures implemented or planned”. However, almost all initial National Communications of non-Annex I Parties include some information on measures to mitigate GHG emissions (UNFCCC 2005b) – albeit in varying levels of detail. There is no officially held register or information depository where non-Annex I countries can submit their developments on climate change mitigation measures that have occurred since the publication of their most recent national communication.

Centralised, official information on actions taken to mitigate GHG emissions in non-Annex I Parties is therefore also sparse. Nevertheless, many Parties have outlined climate-specific (or climate-relevant) policies in official national documents that are not submitted to the UNFCCC. For example, China published its National Climate Change Programme in 2007 (NDRC 2007). This programme includes an assessment of key areas in which GHG mitigation actions could be undertaken in e.g. the energy, industrial, agricultural and forestry sectors. India published its National Action Plan on Climate Change in 2008, identifying eight priority “missions” (GoI 2008). Brazil published its White Paper on Contribution to Prevent Climate Change in 2007, which also outlines its policies, programmes and other actions related to climate change mitigation (GoB 2007). Many other developing countries have reported on measures they are undertaking to mitigate GHG emissions.

Thus, some information on current and/or planned GHG mitigation actions in developing countries is available. However, mitigation actions themselves are not necessarily measured or verified, nor are they necessarily reported to the UNFCCC. Even taking into account the availability of non-official data on mitigation actions, there are therefore significant gaps that would need to be filled if all or some of these actions were to be measured, reported and verified.

Current review procedures are also very different for Annex I and Non-Annex I Parties. Unlike National Communications from Annex I Parties, those from Non-Annex I Parties are not subject to an in-depth review. Since NAI emission inventories are submitted as part of the National Communication (and not separately, on an annual basis, as for Annex I countries), this means that neither NAI country GHG mitigation measures, the effects of these measures, nor their emissions inventories are currently reviewed. This would need to change, at least in part, to ensure that the nationally appropriate mitigation actions undertaken as part of the Bali Action Plan are measured, reported and verified.

Monitoring and reporting activities under the CDM is very different. Each proposed project is approved by the host country government, and detailed information on the project type and emission credits generated is reported to the UNFCCC. The emission reductions from individual CDM projects are verified, via a procedure agreed in the Marrakech Accords. While this information is collected on a project-by-project basis, it could easily be aggregated into a country-by-country basis to provide a quantified and verified estimate of CDM actions and the emission reductions achieved.

3.3 Challenges for MRV of future actions

Widespread measuring, reporting and verification of mitigation actions pose a unique challenge for both developed and developing countries, particularly if MRV focuses on the GHG outcome of such actions. A robust, transparent system for MRV is needed in order to provide confidence that actions are implemented and that they produce claimed results. The scope and effect of actions will necessarily depend on a country’s national circumstances and capacities. There are, however, many common challenges for MRV of mitigation

actions for both developed and developing countries. This paper addresses both the common and differentiated challenges.

One of the key purposes of an MRV framework for mitigation actions is likely to be to ensure that agreed actions are implemented and contribute toward mitigation of GHG emissions¹⁷. Progress toward both full implementation and the resulting impacts of such actions could potentially be measured, reported and verified. While GHG emission reductions are the ultimate goal, not all individual actions will result in direct, immediately measurable emission reductions. For example, Parties may agree to increase R&D spending for mitigation technologies or to create a new regulatory institution. While it would be relatively simple to report and verify implementation of these actions, measurement of their impact on emissions would be much more challenging, particularly if GHG emissions must be accounted for. This section addresses key questions about what information could be subject to MRV.

3.3.1 From efforts to outcomes

In contrast to QELROs, GHG mitigation actions may have many different variables that indicate progress toward achieving full implementation. While GHG emissions (or GHG emission reductions) may be an appropriate metric to measure effectiveness of some actions, it will be difficult, if not impossible, to use such metrics to measure many others. It may be especially difficult to quantify the effectiveness of some policies and measures such as research and development; provision of information/education etc. on possible GHG mitigation actions. Much of the current efforts rely on modelling and econometric analysis to project the potential impacts of such measures (OECD 1998). Assessing the effects of government policies on technological innovation has also proved challenging without reliable quantitative techniques.

Indeed, providing a comprehensive measure of the GHG outcomes of policies and measures has been a challenge for Annex I Parties in preparing their national communications (UNFCCC 2002). However, there are many other potential metrics to measure implementation of a Parties' agreed actions. These may include emissions intensity and other related indicators (e.g. IEA 2008) at the national and/or sectoral level, as well as metrics that do not include GHG emissions, such as the number of demonstration projects or technologies deployed as a result of public investment, or the land area under a particular type of management.

To more accurately measure progress toward implementation of mitigation actions under a future agreement, MRV may occur at one or more points along a spectrum ranging from initial Party efforts, to intermediate outcomes, to the ultimate outcomes (in terms of GHG emission reductions) of those efforts.

Efforts may be defined as the GHG mitigation actions that Parties undertake, for example, setting an energy efficiency standard, instituting an emissions tax, or investing a specific amount in R&D. This is analogous to the proposed approach for sustainable development policies and measures (SD-PAMs) in developing countries where the focus is on meeting non-climate related policy commitments, rather than reaching a particular GHG outcome (Bradley and Pershing 2005). For these types of actions, some measurement could occur at the initial point of effort (e.g. developing an energy efficiency standard).

Intermediate points, where effort and outcomes are not clearly distinguishable, may also be measurable for such actions. For example, once an energy efficiency standard has been put in place, a Party may also measure and report intermediate actions to reach full compliance with this standard, including improving institutional capacity of the relevant regulatory agency, providing incentives, or instituting product labelling. Another intermediate point that could be measured and reported is the number or capacity of energy efficient appliances installed under a particular standard. Measurement and reporting of such steps may facilitate access to useful information, but verification may not be necessary.

¹⁷ Such a framework could also be used for other purposes, e.g. to assess eligibility to participate in market mechanisms.

The GHG outcomes of a particular action could also be measured or estimated – although this will be more complex in some cases than others. For example, estimating the GHG impact of an energy efficiency measure could require estimates of the number of energy efficiency appliances installed under such a measure, the extent to which these appliances are used, calculation of associated energy savings, and then “translation” of these energy savings to GHG mitigation¹⁸. In contrast, the extent of methane capture from landfills could be measured directly.

Thus, the nature of MRV activities will depend on the point(s) where progress can be measured, reported and verified. In situations where the GHG emission reductions resulting from specific actions cannot be measured directly or accurately, other indicators of inputs, efforts and/or outcomes may be needed. What will be important is to have in place reliable and agreed metrics, whether national or international, to measure such actions.

3.3.2 Quantitative and qualitative information

Regardless of whether one measures inputs, intermediate points or outcomes, it may be difficult to quantify the GHG impact of many mitigation actions. For example, if Parties agree to spend a specified amount on R&D in energy efficient technologies, the direct emission reduction benefits may be impossible to measure. In some cases, quantitative data may be more easily compared across countries, but only if measurement is conducted in a transparent and comparable manner. This may require development of common guidelines for measurement of effort or outcomes of specific mitigation actions. A robust system for measuring, reporting and verifying GHG mitigation (in terms of GHG reductions, rather than alternative metrics) would be necessary if crediting mechanisms were instituted for developing countries that meet or exceed emission reductions from their agreed mitigation actions, as proposed under the AWG-KP (UNFCCC 2008b).

Including qualitative information (e.g. policies and measures and/or institutions put in place), in addition to or in place of quantitative data, may provide a more comprehensive picture of the range of mitigation actions taken in particular countries. However, for some actions (e.g. improved policy coherence) qualitative measures may be the only ones possible to determine whether implementation occurs. The most difficult actions to quantify, particularly in terms of GHG, generally fall under the category of policy processes. How would a Party measure its efforts in institutional improvement, capacity-building and outreach, subsidy reform or removal of regulatory barriers to mitigation investments? If a broad range of possible mitigation actions are included in a future agreement, some qualitative measures may need to be incorporated into an MRV framework. However, reporting qualitative information in a way that is compatible with the measurability and verification requirements will necessarily be more challenging than for quantitative information.

3.3.3 Diverse country capabilities

Just as there are varying levels of capability to mitigate GHG emissions, there is a diverse range of national capacities and capabilities to measure, report and verify such activities. The Bali Action Plan calls for consideration of what is “nationally appropriate” in determining mitigation actions. Will such consideration be necessary in determining the type and degree of MRV required based on country capabilities? Or will there be a common MRV framework for all countries? How can guidelines for MRV be flexible enough to accommodate diverse country circumstances while ensuring robust and transparent information?

¹⁸ The International Performance Measurement and Verification Protocol (IPMVP) has developed some relevant methods to assess energy savings from e.g. renewable energy systems, boilers, and energy conservation in buildings (see e.g. EVO 2007). Several methodologies designed to calculate GHG emission reductions from certain types of energy-efficiency projects have also been approved under the CDM. A list of all approved methodologies is available at <http://cdm.unfccc.int/methodologies/PAMethodologies/approved.html>

Parties exhibit a broad range of capacities and experience with monitoring and reporting national emissions, policies and measures. Current requirements for non-Annex I reporting encourage provision of inventory data and information on policies and measures “to the extent their capacities allow.” The Parties themselves determine their own level of capacity and what information they consider relevant. As many non-Annex I Parties have determined that their technical and institutional capacities were inadequate to meet existing guidelines (UNFCCC 2005), meeting any additional requirements for measuring, reporting and verifying mitigation actions will be challenging.

It is, however, unlikely that all developing country Parties will be required to take on mitigation actions that require a high level of MRV. For example, taking into account the principle of common but differentiated responsibilities and respective capabilities may lead to a lower expectation of mitigation actions, and of MRV of such actions, in least-developed countries (LDCs) than developed countries. Differentiation among countries and within country groupings (both developing and developed) is a contentious issue for any post-2012 agreement, and may impact MRV requirements. Similarly, differing capacities to carry out MRV may shape what mitigation actions Parties agree to implement. However, it is possible that mitigation support for developing countries, e.g. in the form of finance or capacity building, could fill some or all of this gap and so improve consistency in an MRV framework across countries.

The post-2012 framework may need to provide flexibility over time to account for the evolution in country circumstances and capabilities. It may also be possible to increase the stringency or comprehensiveness of not only mitigation actions, but also measurement, reporting and verification activities, as Parties increase their capacity over time.

This raises the question of whether MRV requirements can be differentiated within categories of developed or developing countries (e.g. developed countries, EITs, rapidly industrialising countries, middle-income developing countries, and least developed countries) and/or between categories of GHG mitigation actions. In order to create a robust MRV system, decisions will be needed on whether maximum country coverage or common MRV standards is more important. Allowing for different MRV requirements for different countries and/or type of GHG mitigation actions could help extend a MRV system to include a wider range of countries while accounting for their varying capacities, and perhaps allow for graduation over time. However, this possibility of varied MRV requirements should be weighed against the benefit of a common MRV system for all that would allow for common standards and comparability across countries. It may be that some kind of hybrid approach to MRV may emerge which allows for common standards among categories of countries (or actions), with potential links to finance, capacity building and other support to move countries toward progressively stringent MRV standards.

There is also the possibility of different requirements within the individual stages of the MRV process (measurement, reporting and verification). Measurement and reporting is most likely to be carried out by the Parties themselves, requiring a higher level of in-country capacity than is currently required for developing and submitting national communications. In contrast, verification could be conducted by a third party such as an accredited body, or by teams of experts co-ordinated by the UNFCCC Secretariat - thus requiring fewer in-country resources. However, it is also possible that verification could be less stringent in least developed countries where capacity building and development needs significantly outweigh mitigation priorities.

3.3.4 Verification

Decisions about a framework for verification may prove to be the most difficult in reaching a final agreement on MRV efforts. Agreeing on who undertakes the verification could be a contentious point in future negotiations, as several developing countries have made clear their opposition to external verification of their in-country mitigation actions.

Deciding what needs to be verified could be equally contentious. For example, in developing countries, should only those actions that are financed by external support be verified? The question of who decides will be a central one. If each country is allowed to determine the responsibility for and extent of verification of its

own actions, would MRV result in comparable and reliable information? Would common standards for measuring and reporting be enough to ensure a robust MRV system without an international verification process? Current proposals for crediting verifiable mitigation actions by developed countries and/or allowing for trading of emissions mitigated below a set national mitigation action baseline may require a much higher level of verification (UNFCCC 2008).

4. Conclusions and future decision points

The requirement for “measurable, reportable and verifiable” GHG mitigation commitments or actions was introduced by the Bali Action Plan (BAP). This will have a significant impact on what needs to be measured, reported and verified to ensure that Parties meet commitments, or undertake the actions, as agreed. For both developed and developing countries, the BAP also leaves open to interpretation what the terms measurement, reporting and verification entail; what exactly needs to be measured, reported and verified; when MRV should occur; who should do it, and whether any requirements relating to measurement, reporting and/or verification should vary by country and/or type of action. The BAP leaves open, for developed countries, whether enhanced mitigation actions are to take the form of commitments or actions, and whether any commitments are to be in the form of quantified emission limitation or reduction objectives (QELROs) or in another form.

Some experience relevant to MRV – particularly as this relates to QELROs - has been gained via activities undertaken under the UNFCCC and Kyoto Protocol. Monitoring and reporting GHG mitigation actions is patchier, both because comprehensive reports are not required, and because quantifying the GHG impacts of policies can be both complex and uncertain. Current guidelines under the Kyoto Protocol generally refer to monitoring, reporting and review; verification is used only in the Marrakech Accords. There is a potentially large overlap between monitoring, reporting and review activities (under the KP) and what “measurable, reportable and verifiable” could encompass in a post-2012 regime. However, depending on how the terms measurable, reportable and verifiable are defined, there could also be significant differences between current provisions on monitoring and future provisions on measurement, as well as current and future provisions on review and verification.

Current MRV-related requirements are different for Annex I and non-Annex I countries. They are more stringent for Annex I countries in terms of both the content and frequency of reporting and review, and they have been set up to focus on monitoring, reporting and review of quantified emission commitments. Current guidelines do not provide for a quantified overview of GHG mitigation actions (either in terms of GHG outputs, or in other terms) in Annex I countries. Significant revisions to current monitoring and reporting guidelines for Annex I countries, in terms of what is reported and how often, would therefore be needed if the post-2012 climate regime switched to MRV of actions, or of any GHG-related commitments that were not in the form of QELROs.

Current capabilities to undertake MRV-related requirements vary widely between countries. For example, some developed countries (e.g. Belgium) do not routinely report the GHG impacts of GHG-mitigation policies and measures in their National Communications, whereas others (e.g. Germany) do. Similarly, some non-Annex I countries (e.g. Mexico) have had much greater experience in monitoring and reporting national GHG emissions than others (e.g. India).

There is no clear distinction between definitions of review and verification, and indeed the terms “review” and “verify” are both used in the current climate regime. Verification provisions (within the Marrakech Accords) are varied in terms of who undertakes such verification. As such, the current regime does not provide clear guidance as to what verification should entail post-2012.

In order to develop for the post-2012 climate regime an MRV framework that reflects agreed mitigation actions and commitments, decisions will be needed regarding:

- What “measurable, reportable and verifiable” means, and how closely (or not) it relates to provisions under the Kyoto Protocol on “monitoring, reporting and review”.
- Whether actions that are measured, reported and verified are done so at the aggregate (e.g. country) level, the sector level, or some other level, e.g. individual PAMs. Whether the level at which commitments/actions are measured, reported and verified has to be the same for measurement, reporting and verification, or whether it can vary (for example, could information that is measured and reported at the national level be verified at a sub-national level?);
- Whether all countries (or groups of countries) report their actions or commitments using the same metrics (or choose from a predetermined list of options), and whether such metrics focus on the inputs, intermediate outcomes or GHG outcomes of GHG mitigation actions. If a wide variety of different metrics can be reported, work may also be needed on how reporting and verification can be carried out in a transparent manner. Decisions will also be needed on whether qualitative information that is monitored and reported in the existing system can continue to be done so in the future, and whether an evolving scale of MRV is needed (e.g. based on capacities in different countries or on type of mitigation action).
- What should the timing of MRV actions be, and if there is a conditional linkage between support and mitigation actions for developing countries, whether this would need to be reflected in existing national communications or in some other type of reporting/verifying body/framework.

Some of these issues (e.g. whether or not developed and developing countries have different guidance) will need to be resolved in order to reach a framework agreement on a post-2012 climate regime. However, other questions, such as at what level actions could be reported, could be resolved later. Defining MRV priority decision points could be very useful further work in this regard.

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Glossary

AAU	Assigned Amount Unit
AWG-KP	Ad hoc Working Group on further commitments for Annex I Parties under the Kyoto Protocol
BAP	Bali Action Plan
CDM	Clean Development Mechanism
CER	Certified Emission Reduction (the unit of CO ₂ -equivalent emission reductions generated from CDM projects). Forestry CDM projects can generate tCERs or ICERs, both of which expire after a certain amount of time.
CH ₄	Methane
CO ₂	Carbon dioxide
ERU	Emission Reduction Units (the unit of CO ₂ -equivalent emission reductions generated from Joint Implementation projects)
GHG	Greenhouse Gas
GPG	IPCC's good practice guidance on LULUCF
HFC	Hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LDC	Least developed country
MRV	Measurable, reportable and verifiable (as mentioned in the Bali Action Plan)
N ₂ O	Nitrous oxide
PAM	Policies and measures
PFC	Perfluorocarbon
QELRO	Quantified emission limitation and reduction objective
R&D	Research and development
RMU	Removal units
SD-PAM	Sustainable development policies and measures
UNFCCC	United Nations' Framework Convention on Climate Change