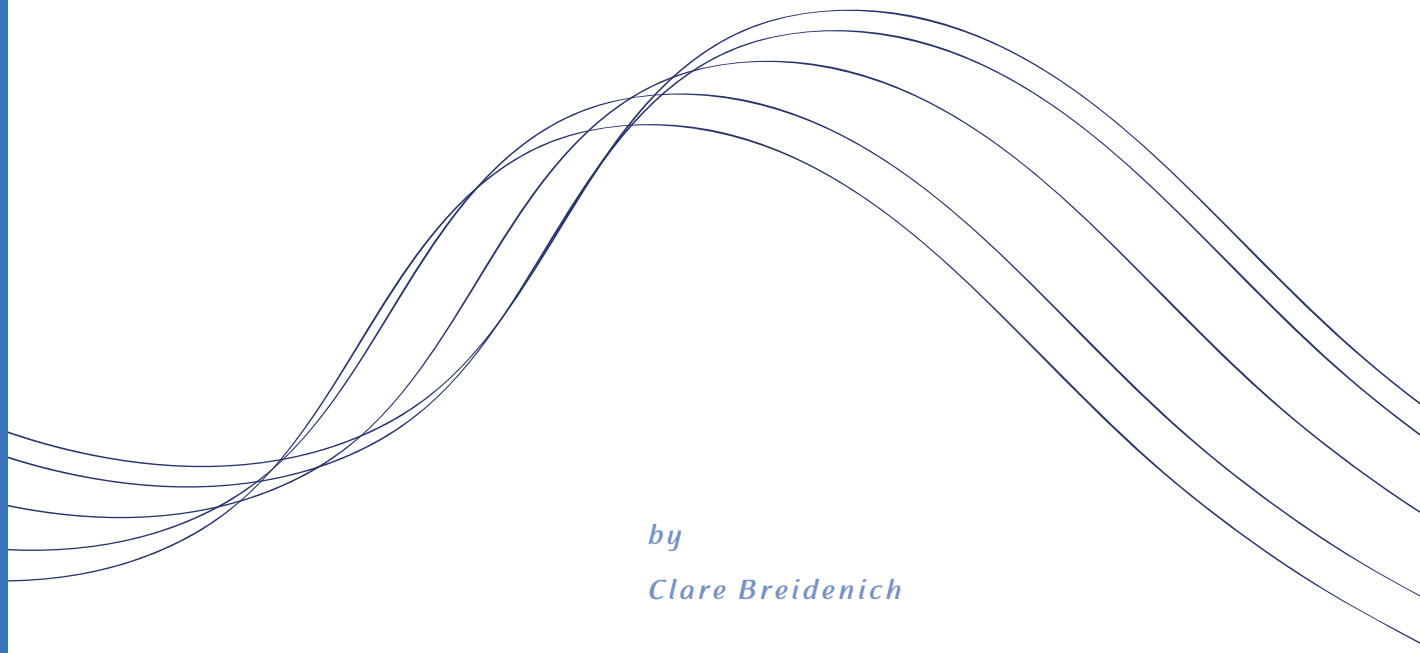
ADVANCING THE INTERNATIONAL EFFORT AGAINST CLIMATE CHANGE

MEASUREMENT, REPORTING AND VERIFICATION IN A POST-2012 CLIMATE AGREEMENT



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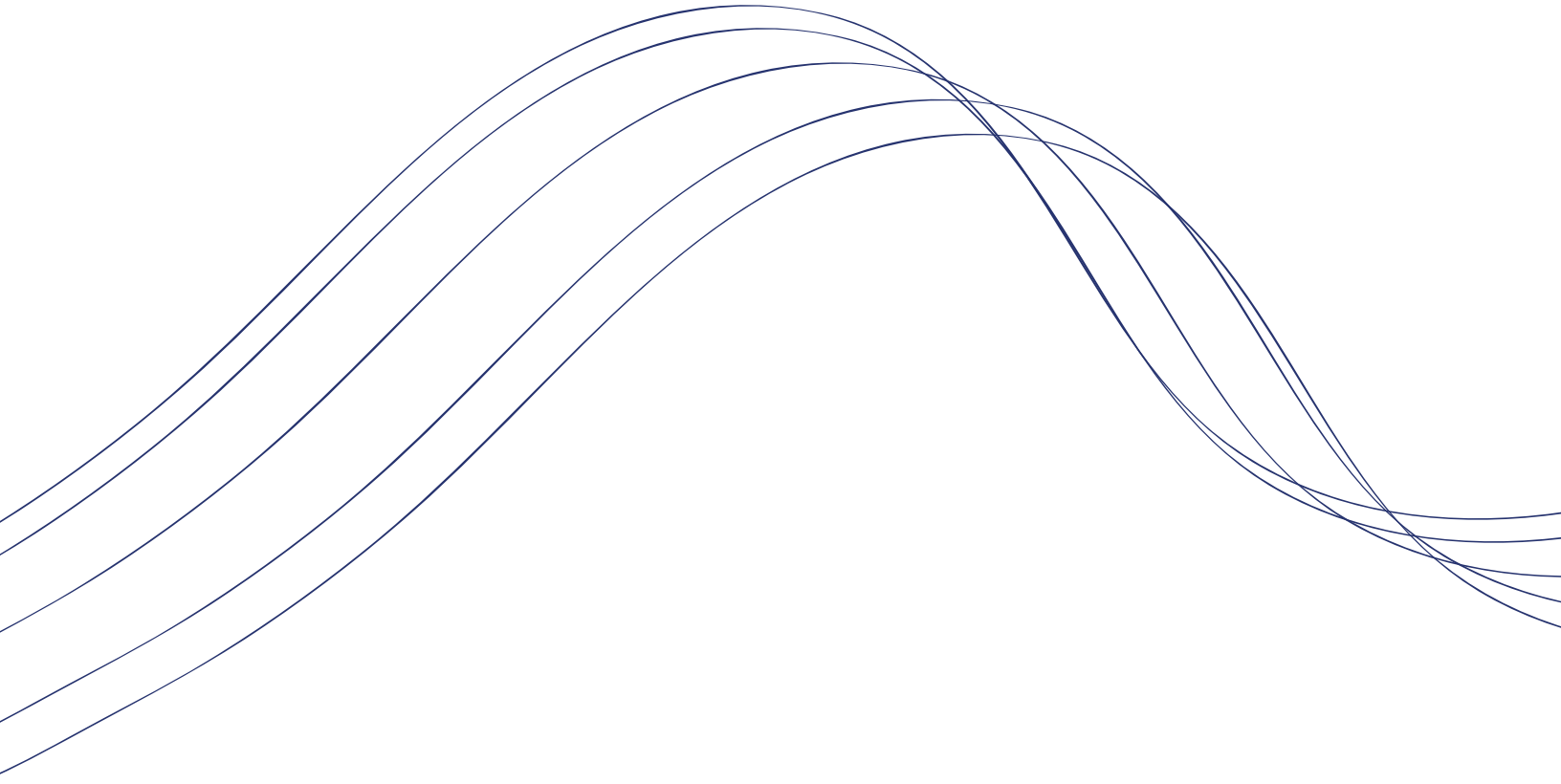

MEASUREMENT, REPORTING AND VERIFICATION IN A POST-2012 CLIMATE AGREEMENT

Prepared for the Pew Center on Global Climate Change

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Introduction

The Bali Action Plan initiated a new round of negotiations under the UN Framework Convention on Climate Change (UNFCCC) with the aim of achieving an "agreed outcome" addressing the full range of climate-related issues, including mitigation, adaptation, technology, and finance. In framing these negotiations, the Bali plan introduces a new construct with its requirement that certain actions be "measurable, reportable and verifiable." Specifically, in paragraphs 1(b)(i) and (ii), addressing mitigation, the plan calls for consideration of:

> *Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives, by all developed country Parties....[and]*
>
> *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.*

The Bali plan appears, then, to anticipate that a new climate agreement will provide for the measurement, reporting, and verification (MRV) of three categories of action: developed country mitigation commitments or actions, developing country mitigation actions, and the provision of support for developing country mitigation actions.

The UNFCCC and the Kyoto Protocol already establish certain requirements and mechanisms providing for the measurement, reporting, and verification of parties' actions. In explicitly delineating and linking these three functions, and in extending them to additional realms of action, the Bali Action Plan establishes MRV as a critical cross-cutting element certain to figure prominently in any new agreement.

MRV can serve a wide range of purposes in a new climate agreement. It can provide an important means of tracking parties' progress individually and collectively toward the Convention's ultimate objective. The very process of measurement can facilitate parties' actions by establishing baselines and helping to identify mitigation potentials. The reporting of actions can allow for their recognition internationally. The review or verification of parties' actions can enhance action through expert advice on opportunities for improvement. MRV could play a particular role in the linkage between developing countries' action and support for those actions. Finally, credible MRV can strengthen mutual confidence in countries' actions and in the regime, thereby enabling a stronger collective effort.

This report considers options for MRV in a new climate agreement. It begins by looking at basic issues in measurement, reporting and verification, and how they are addressed in different international regimes. It then evaluates existing requirements and mechanisms under the UNFCCC and the Kyoto Protocol that are relevant to MRV. Finally, it outlines a range of options for adapting these mechanisms and establishing new ones for purposes of MRV in a new agreement.

I. "MRV" in International Law

In many respects, the concepts of "measurable," "reportable" and "verifiable" are closely linked. Indeed, in many contexts, one might presume that actions or commitments that are measurable are also reportable and verifiable. But each concept presents a distinct set of issues and it is important that, initially at least, each be considered in its own right.

Measurable

What Can Be Measured?

The terms "measure" and "measurability" do not have any agreed definition in international environmental law or in international law more generally. But the concepts are familiar from ordinary usage. The function of measurement is to describe a phenomenon in reasonably precise, objective terms—that is, in terms of an established standard or "unit of measurement." Measurement is thus closely connected with verification, since, unless something can be characterized through measurement, verification is not possible.

Typically, "measurement," is used in connection with quantifiable attributes, such as volume, mass, distance, area, time, and temperature, which can be characterized and determined very precisely. However, virtually any phenomenon can, in principle, be measured. For example, under the Convention on International Trade in Endangered Species (CITES), the secretariat measures parties' compliance with their obligation to enact implementing legislation by qualitatively assessing each state's legislation on a three-point scale. So long as the evaluation can be performed on a reasonably objective basis, applying expert judgment, measurement is possible.

Even limiting the concept of "measurability" to quantifiable attributes, a wide variety of international agreements entail commitments or actions that are "measurable." These include:

- Commitments to achieve particular results, such as reducing emissions of sulfur dioxide under the 1985 Sulphur Protocol, phasing out consumption and production of ozone-depleting substances under the Montreal Protocol, or limiting the number of fish or whales caught under various fisheries agreements. Each of these commitments concerns a quantifiable attribute that can be measured.
- Commitments to perform government acts, such as issuing permits for the import and export of endangered species under CITES, performing inspections of oil tankers under the Paris Memorandum of Understanding on Port State Inspections, and undertaking prosecutions to enforce the vessel-

source pollution standards in the International Convention for the Prevention of Pollution from Ships (MARPOL). Again, each of these commitments involves particular acts that can be quantified (i.e., numbers of permits, inspections or prosecutions).

- Commitments to provide funding, which can be measured in terms of dollars spent.

Although a wide variety of phenomena can be measured, the quality of measurement varies widely. In general, the more precise and certain the description, the better the measurement. That is one reason why measurements of quantifiable attributes are generally preferred to qualitative measurements, since quantification enhances precision.

In some cases, an attribute can be measured directly by comparing it to a reference standard—the length of an object, for example, against a ruler. MARPOL requires oil tankers to install oil discharge monitoring equipment, which directly measures the amount of oil in vessel discharges.[1] Although direct measurements such as these may suggest a high level of certainty, they always involve at least some element of uncertainty, due to the potential for instrumental errors.

Often, it is not practical or even possible to measure an attribute directly, so measurement requires the use of indirect indicators or inferences. In the case of climate, for example, greenhouse gas (GHG) emission inventories are calculated on the basis of direct or indirect indicators (referred to as activity data), such as the number of kilowatt hours produced, the number of miles driven, and so forth—numbers that are themselves, in some cases, derived indirectly from other parameters.

Given the difficulties of determining cause-and-effect relationships, attempting to measure the effects of an activity introduces an additional layer of uncertainty. We can "measure" whether a country has introduced a climate change policy, such as a fuel efficiency standard, and whether emissions from cars decline. But we cannot know for certain how much of any measured emissions decline is attributable to the fuel efficiency standard versus other possible causes.

Reportable

Reporting is perhaps the most ubiquitous commitment in multilateral environmental agreements. Virtually every environmental agreement requires states to provide information, if nothing else. States are generally willing to accept reporting commitments because they impose only a relatively modest burden. And they are seen as important because they provide a foundation for further action.

What Should Be Reported?

As noted earlier with respect to MRV generally, reporting can concern many issues and serve many functions. Under the Bali Action Plan, the association of the term "reportable" with "measurable" and

"verifiable" actions or commitments suggests that the purpose of reporting is to permit others to assess what a country is doing, on an absolute basis and/or relative to others. The information that should be reported thus depends on the nature of a party's actions or commitments.

Relevant information might include:

- National conditions, to provide background and context.
- Government policies and measures, such as technology requirements, performance standards for companies or products, permitting systems, tax policies, subsidies, government-funded research and development (R&D), and international assistance programs.
- Environmental results, including changes in environmental quality, emissions levels, or levels of consumption and production of controlled substances.
- Private activities, such as data on emissions, activity levels, and technology investments.[2]

In general, successful reporting is a function of two factors: (1) the precision and reliability of the reported information, which brings us back to the issue of measurement, and (2) the degree to which information is presented in a transparent and standardized way that allows comparisons between reports and verification by others.

Who Reports?

Self-reporting. Most treaties, including the UNFCCC and the Kyoto Protocol, require states to report on their own performance under an agreement. Typically, the government prepares and submits these national reports, but some regimes provide for a more participatory process, including elements of civil society. Under Agenda 21, for example, many countries have established national sustainable development commissions, with non-governmental organization (NGO) participation, which among other things may prepare reports on national implementation of Agenda 21. Similarly, the reporting guidelines for the Convention on Biological Diversity recommend that states establish a consultative process involving relevant stakeholders in preparing their national reports.

Business actors. Although business actors are often the ultimate target of international environmental standards, and may have the best access to much of the relevant data, few international environmental agreements require direct reporting by private actors.[3] Indeed, some agreements such as the Montreal Protocol allow states to aggregate their national data to preserve the confidentiality of business-level information. A rare example of an environmental agreement that provides for entity-level reporting is MARPOL, which requires oil tankers not only to have oil discharge monitoring equipment, but to keep an oil record book of all discharges during a voyage, which must be made available to port state inspectors.

Non-governmental actors. As noted above, some countries or agreements provide for NGO participation in the preparation of national reports. But, typically, international environmental regimes do not establish a separate reporting process for NGOs. Instead, NGOs publish their reports independently.

Independent experts. In the field of international human rights, international institutions such as the UN Human Rights Commission (now the Human Rights Council) often designate an independent expert as rapporteur for a particular subject, such as torture or the death penalty. The rapporteur studies the subject, gathers information on the performance of individual countries, and prepares a report. Although international environmental regimes have used independent experts to verify national reports (discussed below), they have not thus far used independent experts to engage in more open-ended studies and reporting.

International institutions. In principle, international institutions, such as the treaty secretariat, could prepare reports. But, thus far, CITES is one of the few, if not the only, environmental agreement that authorizes its secretariat to prepare reports on national performance.

Methods and Modalities of Reporting

Many international environmental agreements provide detailed guidance on the preparation of national reports, including reporting formats, templates, or questionnaires.[4] For example, guidelines developed by the Intergovernmental Panel on Climate Change (IPCC) set forth exceptionally detailed methodologies for estimating and reporting emissions under the Framework Convention.[5] These standardized methods serve two functions. First, they identify the information that the international community believes important for an assessment of a country's actions. Second, they help ensure that the information provided can be compared and verified.

Agreements differ in the periodicity of reporting. Many agreements require annual reports, like the annual emission inventories that developed countries must submit under the UNFCCC. But some agreements provide for less frequent reports, such as the Convention on Migratory Species, which requires triennial reports.

As the UNFCCC illustrates, the formats and periodicity of reporting may be differentiated among parties based on differences in their commitments and their capacities to report.

Verifiable

"Verification" generally refers to the process of independently checking the accuracy and reliability of reported information or the procedures used to generate information,[6] although the term is occasionally used differently in international law.[7] Particularly when international agreements impose major costs or states may have other significant reasons not to comply, verification can play a key role in building confidence

among parties. Arms control and nuclear non-proliferation provide two examples. In both cases, strong verification regimes—typically involving on-site inspections either by the other countries to an agreement or by international inspectors—are generally seen as essential.

While verification is often associated with "review" (and in some cases the two overlap), they are not synonymous. Generally speaking, verification is a technical, non-judgmental function, in contrast to review, which may contain more political elements. Thus, on the one hand, an international review need not involve verification, or may go beyond verification to include an evaluation of a country's performance or an assessment of the adequacy of commitments more generally. On the other hand, verification may take place apart from review—for instance, if an agreement provides for verification at the national level or by private third-party auditors.

In its purest form, verification also is distinct from the question of compliance. It involves an assessment of the factual accuracy of information rather than a legal judgment as to whether a country is in compliance with its obligations. But verification is closely related to compliance and sometimes the two blend together. In agreements with compliance procedures, verification can play a preliminary role by providing the factual predicate for later legal determinations. And conformity assessments by third parties (for example, to ensure that oil tankers meet international construction and design standards) involve both verification and compliance functions. Even without a direct link to compliance, verification can play an important role in facilitating implementation by highlighting areas in need of improvement and thereby helping to better target financial or technical assistance.

Most multilateral environmental agreements do not provide for the verification of reported data. Even the Montreal Protocol—generally regarded as an unusually successful environmental agreement—does not establish a regular process to verify the accuracy of the information contained in national reports.[8] Instead, like other multilateral environmental agreements, it provides for verification of nationally-reported information only if a complaint is brought under the Protocol's non-compliance procedure. The expert review process established under the UNFCCC is thus unusual in international environmental law.

Verification of parties' actions depends on three factors: (1) the degree to which reported data is capable of being verified; (2) the actors who conduct the verification, and (3) the manner in which verification is performed.

Capacity to be Verified

A wide variety of quantitative and qualitative information can, in principle, be verified. For example, MARPOL's requirements for the construction, design and equipment of oil tankers can be easily verified by inspecting a tanker to see whether it has the required construction and design elements. Similarly, it is

straightforward to determine whether a country has, in fact, adopted legislation designating a management authority under CITES or has established a permitting system under the London (Dumping) Convention.

In the climate context, whether a state has adopted a measure can be verified, as can emission levels, but the effects of the measure on emissions may be hard to verify, given the difficulty identified above of establishing a reliable connection between cause and effect.

Who Verifies?

A wide variety of actors can play a role in the verification process.

Other states. Bilateral arms controls agreements generally rely on verification by the other party to the agreement through "national technical means of verification" such as satellites, radars, and seismic sensors, as well as through on-site inspections. The World Trade Organization's (WTO) Trade Policy Review Mechanism involves a wider form of peer review, in which member states collectively review each others' trade policies on the basis of a policy statement by the state under review as well as a detailed report by the secretariat, which draws on a wide variety of official and unofficial data sources. The frequency of review is differentiated based on the size of a country's economy: the four members with the largest shares of world trade are reviewed every two years, the next sixteen every four years, and others every six years.

International organizations/secretariat. The most prominent example of verification by an international organization is the International Atomic Energy Agency's (IAEA) role in the nuclear non-proliferation regime. In the environmental arena, the CITES secretariat plays a significant role in reviewing and verifying information in national reports, including through ad hoc verification missions.[9] CITES also involves a monitoring role for the World Customs Organization, and employs the World Conservation Monitoring Centre to maintain a database on imports and exports that allows data submitted by states to be cross-checked.

Independent experts. The UNFCCC and Kyoto Protocol's expert review team process is the leading example in international environmental law of verification by independent experts, and is discussed in greater detail in section II below.

National verification. Although verification typically involves third-party review, verification can be performed at the national level—for example, by government agencies, non-governmental actors, independent experts, or auditors. In the fisheries area, a number of agreements establish international requirements for national verification. For example, the 1995 Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks requires parties to develop national verification procedures for vessels flying their flag. In parallel, the 2001 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing has detailed provisions on "monitoring, control and surveillance,"

intended to ensure that countries have established adequate national systems to check the accuracy of reported data.

Accredited private third-parties. Some environmental standards involve verification by accredited third parties. For example, information regarding projects under the Kyoto Protocol's Clean Development Mechanism (CDM) is verified by designated operating entities, which are accredited by the CDM Executive Body. Similarly, so-called "classification societies" verify that oil tankers are constructed and equipped in conformity with the standards established by the MARPOL agreement concerning vessel-source pollution. Third-party certification bodies also perform conformity assessments of products to verify that they meet applicable standards established by the International Organization for Standardization, or ISO, or other international standard-setting bodies.

NGOs.[10] NGOs typically play an informal role in verifying the accuracy of national reports. For example, Greenpeace checks the accuracy of data on whaling, but must find a willing government to introduce its information because it has no official status at International Whaling Commission meetings. One of the few regimes that allows NGOs to submit information directly is CITES,[11] which permits TRAFFIC, a joint venture of the International Union for Conservation of Nature and the World Wildlife Fund, to provide the secretariat with data on illegal trade in wildlife.

Types and sources of information

As with measurement, verification can be performed either on the basis of direct observation or through indirect indicators. The sources of information used in verification include:

On-site inspections, Perhaps the strongest system of on-site inspections is that provided by the IAEA in the nuclear non-proliferation regime. Several environmental regimes provide for on-site inspections, including CITES and the Ramsar Wetlands Convention.

On-site monitoring. In some cases, environmental performance can be monitored on a continuous basis—for example, through the use of oil discharge monitoring equipment on oil tankers, or systems monitoring the positions of fishing boats on a continuous basis to ensure they do not enter closed areas.

Remote monitoring.[12] In the arms control arena, a significant amount of verification is performed through remote sensing (usually referred to as national technical means of verification). Although environmental monitoring is not performed primarily for verification purposes, the European Monitoring and Evaluation Programme, which monitors transboundary flows of air pollutants among European countries pursuant to the Long-Range Transboundary Air Pollution Convention, is now used to evaluate the emissions data reported by states.

International institutions. In verifying national reports, information from other international institutions may be used, such as the World Bank or, in the case of fisheries and forestry, the Food and Agriculture Organization (FAO). The CITES secretariat, for example, uses information from Interpol and the World Customs Organization in reviewing national reports.

NGOs. In the human rights arena, NGOs write extensive analyses of national reports, which are considered by the various human rights supervisory institutions. In the environmental arena, NGOs play a less prominent role, but are very active in investigating national performance in areas such as trade in wildlife and hazardous wastes.

II. "MRV" in the Climate Regime

The UNFCCC and Kyoto Protocol contain many provisions relating to the measurement and reporting of information on parties' actions. Under the Convention, all parties are required to submit national communications and national emission inventories, but the requirements for Annex I parties (developed countries and economies in transition) and non-Annex I parties (developing countries) differ substantially. Reporting requirements for Annex I countries were expanded and strengthened under the Kyoto Protocol to enable compliance determinations. Both agreements also provide for the review of information submitted by Annex I parties. "Review" under the climate regime has been construed by and large as a technical assessment of implementation, not as a political judgment of performance, and entails verification only in limited areas.

This section assesses existing requirements and practices under the UNFCCC and the Kyoto Protocol vis-à-vis measurement, reporting, and verification. It focuses in particular on GHG inventories; the accounting of transactions under the Kyoto Protocol mechanisms; the Clean Development Mechanism (CDM); and those portions of national communications focused on policies and measures, and on developed country commitments on technology and finance.

Greenhouse Gas Inventories

Article 12 of the Convention requires both Annex I and non-Annex I parties to prepare and submit national GHG inventories. However, the frequency of these submissions, and the information required, are much different. The Kyoto Protocol expands inventory requirements for Annex I parties.

Annex I

For Annex I parties, the inventory requirements are intended under the Convention to enable evaluation of parties' progress in reducing GHG emissions and protecting and enhancing GHG sinks and reservoirs, and under the Protocol to enable determination of compliance with the emissions targets set forth in Annex B. Annex I parties are required to submit detailed annual GHG inventories, prepared using methodologies established by the IPCC and reported according to guidelines adopted by the parties. The inventories are subject to an annual review by expert teams, in accordance with detailed guidelines. At least every five years, reviews are conducted in-country to more thoroughly examine documentation and activity data and to assess a party's institutional, procedural, and archiving arrangements.

Annex I inventories must include complete estimates for all major GHG sources and sinks, as well as a full time-series of annual estimates going back to 1990. The time series helps to identify inconsistent use of methodologies over time and enables the evaluation of emission trends. Inventories are submitted electronically in a standard format to facilitate data analysis and comparison. As part of its annual inventory submission, each Annex I party must submit a National Inventory Report providing detailed documentation on the methods and data sources used to calculate emissions and removals, with emphasis on the most important source and sink categories. Each Annex I party must also describe its inventory planning and compilation practices, including organizational and decision-making responsibilities, quality assurance procedures, and archiving of inventory information.

Reviews of Annex I inventories focus on assessing the conformity of the methodologies and data sources used in the preparation of the inventory with the IPCC Guidelines and Good Practice Guidance.[13] Where possible and appropriate, each party's reported data are compared with its previously submitted data, data reported by other parties, and those maintained by certain international organizations. For instance, each party's reported statistics used in the preparation of estimates of emissions from the energy sector are compared to those maintained by the International Energy Agency. Similarly, statistics used for estimation of agricultural emissions are compared to UN FAO data.

By and large, the requirements for Annex I inventories set high standards for accuracy, completeness, comparability, and transparency. A key foundation for the inventories is the application of mandatory IPCC GHG Guidelines and Good Practice Guidance. Although the IPCC guidelines provide countries with some flexibility in the choice of methods in order to accommodate differences in national capacities and circumstances, they nonetheless ensure that even the simplest methods will maximize the accuracy and comparability of the resulting estimates. While the IPCC Guidelines will undoubtedly continue to be revised and improved,[14] particularly for biogenic sources and sinks, they represent the current state-of-the art in GHG inventory methodologies.

Because of the intense focus on Annex I inventories over the past several years, current reporting and review requirements are sufficiently rigorous to provide a reliable basis to assess implementation of parties' quantitative emission targets. With respect to such commitments, they appear to provide adequately for measurement, reporting, and verification. Their implementation is resource-intensive, however, and parties will need to balance those costs against the value of rigorous MRV.

Non-Annex I

The inventory requirements established by the Conference of the Parties (COP) for non-Annex I parties are much less rigorous than for Annex I parties for two principal reasons: non-Annex I parties have no quantified GHG commitments; and they generally have much less capacity to produce full, regular inventories. Non-Annex

I inventories are prepared using different standards, are submitted far less frequently, and are not subject to international review under the Convention or the Protocol.

For non-Annex I parties, inventories are not reported separately, but as part of their national communications. The Convention requires an initial national communication, contingent on the availability of financial support, and the frequency thereafter is determined by the COP. To date, 134 of the 150 non-Annex I parties have submitted their initial national communications, two (the Republic of Korea and Uruguay) have submitted their second, and one (Mexico) has submitted its third.

Use of IPCC inventory methodologies is not mandatory for non-Annex I parties. (Under the UNFCCC reporting guidelines, non-Annex I parties "should" use the 1996 Inventory Guidelines, while use of the Good Practice Guidance is "encouraged.") Inventory data are provided for one year only, rather than for a full time-series, making it difficult to evaluate emission trends. Reporting is mandatory only for the three main GHGs—carbon dioxide, methane and nitrous oxide. While these account for most emissions in the majority of non-Annex I countries, other GHGs are significant and increasing sources in several countries. While non-Annex I parties are encouraged to describe their methods and data sources, they are not required to provide the detailed documentation that would be required to assess whether IPCC guidelines were appropriately applied.

Many non-Annex I parties have gone beyond the reporting requirements established by the COP in one or more ways, such as reporting data for multiple years, providing detailed breakdowns of emissions and removals, and documenting inventory methods and data according to IPCC Good Practice Guidance. However, the quality of non-Annex I inventories submitted to date has not been assessed because non-Annex I national communications are not reviewed. Instead, the UNFCCC secretariat produces a compilation and synthesis report identifying gaps in the national communications and inventories, as well as problems and capacity-building needs encountered by parties in preparing them.

A Consultative Group of Experts (CGE) on non-Annex I national communications established by the COP had provided a forum for parties to share their experiences and to identify barriers and capacity building needs. The CGE provided some feedback to non-Annex I countries on their inventories, but this process is geared toward improving the preparation of national communications, rather than reviewing or verifying submitted inventories. The CGE's mandate expired in 2007 and has not been renewed.

Current non-Annex I reporting requirements are not adequate to produce accurate, complete, comparable, and transparent GHG inventories. As such, they do not provide a reliable basis for verifying national-level mitigation actions or for considering emission trends for non-Annex I parties as a whole. In many cases, the preparation and submission of inventories are also significantly hampered by a lack of capacity. While non-Annex I parties receive financial assistance for the full costs of preparing their communications, the funding is

tied to the timing of submissions. It is thus highly episodic, making it difficult for parties to maintain ongoing inventory capacity.[15] The ability of non-Annex I parties to prepare higher quality inventories is very much dependent on the availability of funding and training to prepare inventories on an ongoing basis.

Accounting of Emission Units under the Kyoto Protocol

In addition to GHG inventories, the Kyoto Protocol requires that Annex I parties report information on transactions of emissions units under the Kyoto mechanisms in order to assess their compliance with their emission targets. Transactions of Kyoto Protocol emissions units[16] are tracked through an electronic system of national registries established by parties, and the Independent Transaction Log (ITL) administered by the UNFCCC secretariat. In addition, a separate registry tracks the issuance and transfer of credits from CDM projects.

National registries must demonstrate that they meet detailed technical requirements (called the Data Exchange Standards) covering issues such as transaction rules, communications and data security before they may be connected to other registries and the ITL. Registries also undergo ongoing technical review and testing to ensure that they continue to function as required. Once a registry is connected to the ITL, all transactions covered by the Kyoto Protocol are checked by the ITL before they can be carried out, which guards against transactions violating the rules of the Kyoto mechanisms. In addition, each Annex I party must submit an annual report, in conjunction with its national inventory, on its holdings and tracking of units under the Kyoto mechanisms.

Because national registries and the ITL did not become fully operational until 2008, and the reporting and review of assigned amount information will not begin until 2009, it is difficult to assess their performance. However, if the registry systems and ITL operate as planned, monitoring and verification of transactions will take place in real time, and unauthorized transactions are unlikely to occur. In this case, annual reporting and review of transaction information will provide for greater transparency, but otherwise will not significantly add to the reliability of the registry checks.

Greenhouse Gas Mitigation Measures

All parties are required to implement measures to mitigate GHG emissions and to provide a general description of these measures in their national communications. The Convention and Protocol identify possible types of policies and measures, but do not require states to adopt any in particular.[17] As with national inventories, reporting requirements differ substantially for Annex I and non-Annex I parties.

Annex I

Annex I parties are required to provide detailed information on the policies and measures they are implementing to meet their Convention obligations and their Kyoto targets. Parties' reports describe: national policy contexts; specific policies and measures contributing to GHG mitigation by sector and by gas; their implementation status; and, where feasible, quantitative estimates of their effect to date on emissions. In addition, Annex I parties are required to report estimates of their measures' projected impact on future emissions and removals.

However, with parties' commitments related to mitigation measures so loosely defined, specific standards or metrics for measuring and reporting policies and measures have not been adopted under either the Convention or the Protocol. Further, the reporting guidelines do not require documentation to substantiate parties' estimates of the GHG effects of their policies and measures. Consequently, the type and level of information provided on mitigation measures varies widely across parties.

The information regarding mitigation measures is reviewed as part of a party's national communication. While inventory reviews are based on clear guidelines and standards, there are no explicit guidelines for review of national communications under the Convention, only an overall objective and a list of tasks. While review guidelines have been adopted under the Protocol, they are geared toward assessing the transparency and completeness of the information. As a result, under both the Convention and the Protocol, the review of GHG mitigation measures is largely facilitative: expert teams meet with national experts and stakeholders to better understand, and provide feedback on, the information reported in the national communication. To the extent possible, review teams attempt to verify reported information and check emissions estimates against inventories or other data, but their ability to truly verify this information is limited.

Due to the lack of specificity in parties' commitments and, consequently, in the reporting guidelines, the information currently provided by Annex I parties on mitigation policies and measures does not allow a full assessment or verification of their effectiveness, or a comparison of efforts across countries.

Non-Annex I

As with national inventories, the reporting guidelines for non-Annex I parties are significantly weaker. While parties are encouraged to report on their policies and measures, they have complete flexibility in whether and how they do so. While many non-Annex I parties do report on policies and measures contributing to GHG mitigation, the amount of information provided and the level of detail vary widely from country to country. As noted earlier, non-Annex I national communications are not subject to review.

Financial and Technology Commitments

Annex II parties[18] have a number of commitments under both the Convention and the Protocol relating to the provision of support to developing countries. These include:

- Providing "new and additional financial resources" to meet the "agreed full costs" of preparing national communications;
- Providing financial resources for meeting the "agreed full incremental costs" of implementing other commitments;
- Providing assistance to developing countries that are particularly vulnerable to climate change to meet the costs of adaptation; and
- Taking all practicable steps to promote, facilitate and finance transfer of and access to climate-friendly technologies.

In their national communications, Annex II parties are required to report the resources they provide for these purposes bilaterally and through the Global Environment Facility (GEF) and other multilateral organizations. With respect to technology transfer, Annex II parties report on activities undertaken by both the public and private sectors.

The quality of reporting is mixed. Quantification of financial resources provided for developing countries in aggregate is relatively straight-forward. Contributions to the GEF institutions can be identified as expenditures in national budgets. However, data gaps and inconsistencies in the reporting of resources provided bilaterally and through other multilateral channels suggest that Annex II parties have difficulty in collecting and reporting this information. In some cases, this may be because financial resources are provided by several different government ministries and agencies. Further, there is no common standard for determining the extent to which these resources are specifically dedicated to climate change, and what constitutes "new and additional" financing.[19] As a result, information is not generally reported in a way that facilitates comparison and evaluation. The Organisation of Economic Co-operation and Development's (OECD) Development Assistance Committee has developed a reporting standard (the "Rio Markers") to improve the consistency and completeness of parties' classification and reporting of climate assistance. While use of this standard has been encouraged, it is not required under the UNFCCC or Kyoto reporting guidelines.

The information reported is reviewed along with the rest of a party's national communication. Generally, the expert review team attempts to verify the reported information in conversations with national experts, but the reported information is not cross-checked against information from the GEF or other multilateral institutions, or against the party's primary documents, such as fiscal budgets. As in the case of GHG policies

and measures, the very general nature of Annex II commitments on financial and technology support, and the corresponding vagueness of the reporting guidelines, do not ensure consistent measurement, or allow for verification of parties' implementation of these commitments.

Clean Development Mechanism

In addition to the national reporting provisions, the Kyoto Protocol has established separate mechanisms to review and certify GHG mitigation projects—Joint Implementation (JI) and the CDM. Emission reductions achieved through CDM and JI projects generate tradable emission credits that can be used by Annex I parties in meeting their emission targets. The two mechanisms require the use of specific methodologies, tailored to different project types, to calculate project baselines and emissions reductions or removals.[20] Because the credits generated are used for compliance purposes, they are subject to third-party validation and verification.

The CDM relies on a multi-stage process for the review of projects and resulting emission reductions. An initial validation stage confirms that a project meets eligibility requirements results in its registration. Once registered and underway, a project is subject to ongoing verification of its performance at periodic intervals. When a project's actual emission reductions or removals are verified, there are certified for crediting by the CDM Executive Board.

The measurement standards for emissions and removals from CDM projects are generally high. Many of the methodologies are derived from the IPCC, and all are subject to review by an expert panel and must be approved by the CDM board. While there has been ongoing debate about the quality of CDM credits, most of the concerns center on how "additionality" is determined, rather than monitoring and verification standards for project emissions and removals. In addition, unlike the national communication review process, CDM relies on third-party Designated Operational Entities (DOEs) to assess both project eligibility and performance. DOEs are authorized by the CDM Executive Board and are held to strict accountability and quality standards.

Generally, the CDM process provides a substantial degree of rigor in the measurement and verification of project-level mitigation activities. However, applying this rigor at the project level is very resource-intensive. Additionality must be assessed case by case, and performance must be monitored and verified using project-specific baselines and methodologies. Financing for verification is provided by project participants, who cede a fraction of their credits to cover the CDM's administrative costs. In addition, project developers must pay fees to the DOEs for their services. Some of the tradeoffs for project-level crediting are higher transaction costs and a longer, more cumbersome project cycle. Greater standardization of baselines and methodologies would help to reduce transaction costs and improve the overall efficiency of the process.

III. Options for MRV in a New Climate Agreement

The treatment of measurement, reporting and verification in any new climate agreement will depend not only on parties' views of the appropriate role of MRV but also on the fundamental shape of the agreement. Of particular importance are the types of actions parties agree to undertake and the role of market mechanisms. These issues will be decided only in the course of negotiation, but in parties' submissions and in discussions since Bali, some of the broad contours of a potential agreement have begun to emerge. What they suggest is a "multi-track" framework in which different countries or groups of countries assume different types of commitments or actions along different tracks.[21]

The expectation among many parties is that, in the case of developed countries, mitigation commitments will principally take the form absolute economy-wide emission targets, with comparable MRV requirements applying to Kyoto parties and non-parties. These targets could be supplemented by other mitigation commitments such as sectoral policies or agreements. The general expectation in the case of developing countries is that while some might agree to some form of emissions target, most of their actions will be of a different form. Many parties have embraced the idea of a "registry" as a means of reflecting developing country actions in the international framework. MRV for non-target mitigation actions would likely be different than for targets, and some parties have proposed further differentiation of MRV depending on a country's circumstances or the nature of its actions.

As a practical matter, it seems advisable that new MRV provisions build wherever possible on existing guidelines and practices under the Convention and the Protocol, which are widely accepted and supported by parties, in part because of their reliance on party-nominated experts. In some areas, processes already in place should be adequate for MRV purposes. The success of the Annex I review process, particularly for GHG inventories, has demonstrated that expert review teams can provide objective, critical, and credible assessments. Even where existing mechanisms fall short, many could meet MRV needs under a new agreement if sufficiently strengthened.

If a new agreement does follow a multi-track model, it could include some MRV mechanisms that apply across tracks and others that are track-specific. This section considers one potential cross-cutting mechanism: requiring national GHG inventories by all major-emitting countries. It then considers a range of MRV options with respect to emission targets; non-target mitigation actions; and finance/technology support for developing countries, including crediting.

Greenhouse Gas Inventories

One potential cross-cutting approach worth highlighting is national GHG inventories. As discussed below, existing requirements for Annex I inventories appear adequate for MRV of absolute economy-wide emission targets like those under the Kyoto Protocol. Comparably rigorous inventories would not necessarily be needed for MRV of actions by countries not undertaking emission targets. However, regular comprehensive inventories by all major-emitting countries would be a valuable foundation for stronger mitigation efforts. More frequent inventories would provide an important stimulus for ongoing data collection and for maintenance of in-country inventory capacity. It also would provide a fundamental basis for identifying opportunities for GHG mitigation at the national level. While perhaps not strictly necessary under the terms of the Bali Action Plan, a stronger cross-cutting inventory requirement could be justified as contributing to the broader objectives of the plan and the Convention.

While inventories for countries not undertaking emission targets would not need to be as rigorous or frequent, they would need to be stronger and more frequent than those now required of non-Annex I parties. These inventories should follow the IPCC Good Practice Guidance, include a full-time series of emissions data, and provide documentation of the methodologies used. As in the case of Annex I inventories, reviews should be conducted by expert teams. However, in lieu of resource-intensive in-country visits, these could be limited to "centralized" reviews like those often done for Annex I inventories, with experts working together to collectively review several inventories simultaneously.

If more rigorous and frequent inventories were to be required of major developing countries, most would likely need support, at least in initial stages, in order to establish and maintain the necessary national capacities.

Emission Targets

Emission targets could take a number of forms under a future climate agreement—absolute targets, intensity targets (e.g., emissions indexed to economic output), or sectoral targets. Regardless of how targets are formulated, the primary instrument for evaluating performance in achieving them is GHG inventories.

In the case of economy-wide emission targets, such as those in the Kyoto Protocol, national-level inventories of all GHG sectors are necessary for measurement, reporting and verification. Conversely, for sectoral targets, only emissions data from the particular sector(s) in question are required. Intensity targets—whether set at the national or sectoral level—would also require reliable and comparable data on economic output at the appropriate level.

As noted, current Annex I requirements for GHG inventory reporting and review already provide a reliable basis for MRV of absolute economy-wide emission targets—as do the Kyoto Protocol's transaction accounting requirements, in the case of parties also participating in international emissions trading. If other countries were to assume such targets, they likely would be required to conform to the same requirements in order to receive full access to the trading system.

Non-Target Mitigation Actions

Among the key issues to be negotiated under the Bali Action Plan are the nature of nationally appropriate mitigation actions (NAMAs), and how they should be reflected in a new agreement. How those actions could or should be measured, reported and verified will depend very heavily on how the actions themselves are defined. In turn, however, the need for these actions to be MRV-able could strongly influence the way parties choose to define them.

Mitigation measures could take many forms: energy efficiency standards or goals for particular sectors, renewable energy targets, carbon taxes, etc. Allowing such diversity enables countries to take a more individualized approach, undertaking and agreeing to the specific actions that best match their circumstances and development objectives. However, in many respects, this diversity makes MRV far more challenging than in the case of emission targets, as different approaches are needed for different types of actions.

In general, the more specific—and quantified—the GHG mitigation measure, the easier it will be to measure and verify performance. For instance, improving the fuel efficiency of vehicles is more easily MRV'd than an action defined as addressing emissions from transportation, where any number of metrics could apply (investment in public transit, fuel efficiency, vehicle miles traveled, etc.). MRV of non-target actions could be made more manageable by somehow bounding the types of actions that are agreed—for instance, by establishing a menu from which parties choose.

Some general considerations in developing an MRV approach for non-target mitigation actions include:

- **Actions vs. outcomes**. While the Bali Action Plan refers to MRV of mitigation "actions," one question for parties is whether or under what circumstances MRV requirements should apply to actions per se, to their outcomes, or to both. Verifying the implementation of an agreed action may give little indication of its impact on energy efficiency, for instance, or on GHG emissions. Ultimately, however, credible assessment of a party's contribution and progress toward the Convention's objective requires measurement, if not verification, of emission outcomes.
- **Ex-post/ex-ante**. While *verification* of an action can by definition be only ex-post, *measurement* may also be relevant ex-ante to establish the nature of a proposed or agreed action and the level of effort it represents. For instance, if a party commits to improving a sector's energy efficiency, ex-ante

measurement may be necessary to establish the baseline efficiency against which to measure future performance. In addition, during negotiations, parties may require some projection of an action's likely effect on emissions at the time it is proposed.

- **Metrics**. A process will be needed for the development and approval of common metrics to ensure that reported data are reliable and, in the case of countries with similar actions, comparable. Some metrics may be needed in the course of negotiations; others could be established once agreement is reached through the elaboration of reporting requirements. Different metrics are needed for different types of actions and outcomes. And even in the case of a single type of action—such as energy efficiency standards—different metrics are needed in different sectors.
- **Differentiation**. Parties must consider whether standards, frequency, or other aspects of MRV for non-target mitigation actions should be differentiated depending on a country's circumstances or the nature of its actions—for instance, whether an action is unilateral, supported by a financial mechanism, or a basis for emissions crediting.

These and other considerations will shape parties' views of options for three specific MRV functions: reporting of actions; verification/review of reported actions; and linkage to support for actions.

Reporting

Existing requirements do not provide an appropriate mechanism for the reporting of non-target mitigation actions. National communications are too broad and inconsistent across parties to facilitate MRV of specific GHG actions. Annex I inventories provide an important basis for evaluating the effectiveness of the entirety of a party's GHG mitigation actions over time, but do not support evaluation of specific measures. Non-Annex I inventories and national communications are too infrequent and unreliable to support evaluation of national actions.

One option is to strengthen guidelines for national communications and require them more frequently. However, much of the information provided in national communications is not needed for MRV of mitigation actions, and frequent submission of a full communication would be burdensome for many parties. An alternative is the establishment of a NAMA report to be submitted regularly, perhaps on a biennial or triennial basis. This report need not substitute for a national communication (although the scope of the national communications could be narrowed if NAMA reports are required). Instead, it could serve as a more detailed, rigorous, and regular version of the policies and measures chapter of the national communications now required of Annex I countries.

A NAMA report could provide detailed information on the goals, status and means of implementation of a country's mitigation actions, as is currently required in Annex I national communications. Additionally, parties could be required to report on agreed performance metrics in a common reporting format. Performance

indicators should be specific to the type of action, and, where relevant, should be substantiated by the national GHG inventory. For instance, trends in GHG emissions from the transportation sector could be used to document performance of a transportation-related NAMA. Reports could be required of all parties agreeing to non-target mitigation actions, or only of those parties without emission targets. Parties with targets would be subject to MRV on their targets, and could report on their non-target mitigation actions in their national communications.

Verification

Parties will need to decide whether or in what cases verification is done nationally or at the international level. The Bali Action Plan makes no specific reference to international review. Conceivably, a future agreement could provide for national verification rather than international review. However, given the established emphasis on reporting and review in the climate regime, and given the importance of transparency in establishing and maintaining confidence among parties, it seems likely that MRV of non-target actions would entail some form of international review of reported information or of national-level verification procedures. If so, key questions include the scope, means, and standards of review.

Different approaches to verification may be appropriate depending on whether mitigation actions are undertaken unilaterally or with international assistance. For unilateral GHG mitigation actions (i.e., those undertaken by developing countries without assistance from developed countries) verification at the national level may be sufficient, with international review only of a country's verification procedures, not its mitigation actions. In this approach, the COP would need to establish clear guidelines for the types of information to be collected and the methods of verification. Parties would include information on their verification procedures and the results in their national communications or NAMA reports. The aim of international review would be to ensure that parties are conforming to these international measurement and verification guidelines. Parties might also consider providing a mechanism by which in-country stakeholders could directly provide information regarding the performance of national GHG mitigation actions for consideration in the international review.

For GHG mitigation actions undertaken with the assistance of developed countries, there is a stronger argument for verification through international review. One option is to adapt the present system of expert team reviews. This approach has the advantage of being a well-established process, with the confidence and support of parties. In-country visits give review teams greater access to background documentation and national experts, and therefore enable a more thorough review. However, the expert review process, and in-country reviews in particular, are very resource-intensive. A centralized review process, while not as in-depth, may be more cost-effective for the review of GHG mitigation actions. Currently, centralized reviews are not used to review national communications,[22] possibly in part because the information reported is not conducive to

this type of review. However, if reporting is improved to require use of specific indicators and submission of substantiating documentation, a centralized review may be sufficiently rigorous for MRV of mitigation actions.

An alternative is to revive the Consultative Group of Experts with an extended mandate including a true review function. The CGE operated as a standing body of 24 experts, nominated by regional groups, with expertise covering all aspects of national communications. If a revived CGE were to review NAMA reports, its membership would need to be extended to include more specific GHG mitigation expertise. Doing this on an ad hoc basis, as opposed to increasing the size of the standing body, would enable a larger number of experts to participate in the reviews, enhancing parties' confidence in the process by ensuring that different perspectives are reflected, and helping to strengthen capacity in developing countries. Reviews could be conducted regionally, building on the CGE's past regional capacity-building workshops.

Linkage to Support

To the extent that the mitigation actions of developing countries are tied to or contingent on support from developed countries, or vice versa, parties may want to consider mechanisms to coordinate or expressly link MRV of the two.

One option is to have the designated financial mechanism and the body reviewing country's mitigation actions report to one another. For instance, the financial mechanism could report on the support provided for specific actions, so that that information can be taken into account in the review of implementation of those actions. The review body could then report back to the financial mechanism on a party's progress in implementing an agreed action, thereby entitling the party to continued support.

Another option is for a single body to serve both as the financial mechanism and as the body reviewing and verifying parties' actions. Several parties have proposed that developing country NAMAs be listed in a "registry," which could serve as a vehicle for lining up support with specific mitigation actions, and for verification of both. A similar approach is employed under the Montreal Protocol Fund, which supports actions by developing countries to phase out ozone-depleting substances as required under the Montreal Protocol. In this case, developing countries propose specific actions consistent with their general obligation, along with an assessment of financial needs to implement these action and performance objectives. The national plan and funding for implementation are negotiated with and ultimately approved by the fund's executive board. Developing countries must then demonstrate through annual reporting that their performance objectives have been met in order to continue to receive funding.

The Global Environment Facility, the designated financial mechanism under the climate regime, currently reports to the COP on its funding of climate change projects, including their size, type and host country, but does not report on the performance of these projects. However, the GEF has infrastructure and procedures

in place for monitoring and evaluation of climate projects at all stages. Countries receiving GEF funding are required to report and evaluate a project's effects using approved indicators, including GHG emissions. Projects are also subject to a "terminal evaluation" by independent experts. The GEF is also beginning to produce country-level evaluation reports covering all the projects within a country's GEF portfolio. To the extent that NAMAs are funded by the GEF, it could be asked to provide country-level assessments based on its evaluation of supported projects. Such assessments, in combination with information on donor contributions to the GEF, could provide a basis to review both the provision of funding and its use. In this way, MRV could help better target funding to overcome barriers to NAMA implementation. If parties establish or designate an alternative financial mechanism, it could employ similar approaches.

In those cases where mitigation actions are eligible for crediting, the CDM or an alternative crediting infrastructure could be used for verification. Discussions to date have already opened the door for "programmatic CDM," i.e., crediting of emission reductions achieved through a program of mitigation activities. Such an approach might be extended for crediting of sectoral policies or other recognized national mitigation actions. These types of crediting could continue to rely on the existing procedures for registration, reporting and monitoring of projects, and validation and verification of emission reductions by designated operational entities, but would be based on sectoral or national-level emissions data. Host countries would be required to provide detailed national or sector-wide inventories to establish the baseline for crediting, and to continue to provide periodic inventories to monitor performance. Crediting of emission reductions would then be based on inventories verified by DOEs.

Finance and Technology Support

As in the case of non-target mitigation actions, MRV of technology, finance and capacity-building support for developing countries will depend heavily on how any such obligations are defined. Existing commitments under the Convention are so general that meaningful MRV of parties' performance is impractical. One fundamental prerequisite for MRV of developing country support is greater specificity regarding obligations or expectations.

With respect to financial support, one critical question is whether funds will be required to flow through a single designated mechanism, or whether a new agreement would continue to recognize funds provided through a range of bilateral and multilateral channels, as is currently the case under Article 4 of the Convention and Article 11 of the Kyoto Protocol.

MRV of financial support would be more straightforward for funding that is channeled and disbursed through designated multilateral mechanisms. One option would be for parties to commit to given funding levels—specified sums, for instance, or an assessment based on an agreed formula. In that event, a donor

country would likely provide funds from a single source, such as a general fund or aid agency, and the information it reports could be readily verified against data maintained by the receiving organization.

Alternatively, funding could be generated through an internationally agreed instrument, such as a levy on aviation or other GHG-generating activities, a levy on international emissions trading, or an auction of international emission allowances. MRV of funding generated through levies would depend on where and how they are applied. A levy on GHG-generating activities would most likely need to be collected by national governments. For instance, a levy on aviation could be applied at the point of fueling, in which case parties would need to report on fuel sales volumes, and this information would need to be verified.

If the levy involves the Kyoto mechanisms, it could be determined and tracked centrally through the International Transaction Log. For instance, if the levy were applied to international emissions trading, a surcharge could be applied to specific transactions, such as transfer or retirement, and the ITL could be used to tally the surcharges owed by national governments.

If the levy were set up as a portion of a party's target, or of individual transactions, then the ITL could actually be used to collect the levy. This is basically how the current adaptation levy for CDM projects is applied—the CDM registry collects two percent of the certified emission reductions issued for each project, and these credits are pooled into a centralized account for the Adaptation Fund. A similar approach could be used if parties were to agree that a portion of parties' emission allowances should be set aside and auctioned as a source of finance.

To the extent that a new climate agreement recognizes funding provided through multilateral development banks (MDBs), MRV could be facilitated through enhanced cooperation with the banks. Parties may find it difficult to identify what portion of their contributions is used for climate-related activities, and more specifically, climate mitigation. In some cases, like the Climate Investment Funds recently established at the World Bank, donor countries can earmark contributions for specific funds. But often this is not the case. MDB cooperation would therefore be necessary to identify the level of resources dedicated to funding specific climate-related activities. Information maintained by MDBs could also be used to verify contributions reported.

For bilateral aid, it will be important to establish common definitions of what is "climate-related" and what is "new and additional." Such definitions should allow for consistent and comparable reporting of information by countries providing support, and provide clear criteria for review. One option would be to adopt the Rio Markers developed by Organization for Economic Cooperation and Development's Development Assistance Committees for use in preparing national communications. Reported information could then be cross-checked with data reported to the OECD and maintained in its Creditor Reporting System (CRS). Currently, under an "Aid-for-Trade" program, the OECD is cooperating with the World Trade Organization

to monitor trade-related financial flows. The program relies on self-reporting of financial support in WTO-defined categories of trade-related financing, but supplements this with developing country assessments of the effectiveness of this financing. This effort has been useful to the WTO in evaluating trends in trade-related financial flows, as well as their overall impact.

Common definitions also would help improve reporting of activities and financing to support technology transfer. Work underway in the Expert Group on Technology Transfer may be helpful in this regard. The review process should also be strengthened to enable review teams to verify parties' reported information against data from other organizations, or against party's primary sources, such as program or budget reports.

IV. Conclusions

The Bali Action Plan clearly establishes MRV as a core element of a future climate agreement. The ability of parties to reach agreement on new commitments will depend in part in their confidence that those commitments can be reliably measured, reported and verified.

Parties' experiences to date with reporting and review under the Framework Convention and the Kyoto Protocol offer insights into the design of MRV under a future agreement. Current procedures and requirements work well in some areas, notably Annex I emission inventories, but are deficient in others, such as parties' mitigation actions, and financial and technological support for developing countries. In the latter cases, the shortcomings appear to stem less from inadequate reporting and review procedures than from the vagueness of the commitments themselves. The lesson for a future agreement is that credible MRV rests, to a significant degree, on clearly defined commitments. The more specific the commitment, the more readily appropriate metrics and processes can be established for measuring and verifying their implementation.

If, as appears likely, the climate regime evolves further toward a multi-track framework, with different types of mitigation actions or commitments for different groups of countries, this heterogeneity will likely be reflected in MRV as well. The approaches used to report on and verify implementation of economy-wide emission targets may not be appropriate for mitigation actions such as energy efficiency standards or renewable energy targets; other models may be more practical and cost-effective. Further differentiation of MRV approaches may be appropriate depending on whether an action is unilateral, supported, or a basis for emissions crediting. This diversity of approaches will likely be acceptable, however, only if all are perceived to be sufficiently rigorous.

Finally, parties must consider the appropriate balance between the need for rigor and confidence on the one hand, and limited resources on the other. While fully verifying implementation of each parties' every commitment may be technically feasible, it may not be affordable or practical. Parties should aim for MRV provisions that provide sufficient confidence in their respective efforts, and in the overall regime, without needlessly diverting resources from other critical objectives.

Notes

1. MARPOL Annex I, Reg. 15(30(a).

2. For example, the Montreal Protocol requires countries to provide statistical data on imports and exports, the amounts of each controlled substance used for feedstocks, and the amounts recycled.

3. Instead, to the extent that private actors report on their activities or performance, it is generally as a result of national requirements.

4. UNEP (2007), at 105-06.

5. UNFCCC Reporting Guidelines on Annual Inventories, UNFCCC Dec. 3/CP.5 (1997); Non-Annex I Communications, UNFCCC Dec. 17/CP.8.

6. UNEP (2007), at 22 ("Verification is a process undertaken to test the accuracy of data or information provided by a Party to the MEA Secretariat. The process is undertaken by a third party, such as the Secretariat or an NGO, or by them in combination with other Parties to the treaty.").

7. For example, Article 19 of the Basel Convention, entitled "verification," is not about the verification of data, but rather establishes a procedure for individual states can initiate actions when it believes another state has violated the Convention.

8. Brack (2003).

9. UNEP (2007), at 41.

10. Meier and Tanner (2001).

11. CITES, Art. 12.1 authorizes the secretariat to work with "suitable" NGOs "to the extent and in the manner [the secretariat] deems appropriate."

12. Aschbacher (2002).

13. The 1996 IPCC Inventory Guidelines cover specific methodologies and data to be used for estimating each source and sink category. The Good Practice Guidance covers general inventory preparation activities, including planning, prioritization and development, data collection and archiving, and quality assurance and control.

14. The recently developed 2006 Inventory Guidelines for National Greenhouse Gas Inventories have not yet been adopted for use under the Convention and Kyoto Protocol.

15. Some funding has been provided to maintain capacity between submission of first and second national communications, but it is capped at US$100,000 per country, competes with other needs such as adaptation, and is not available after submission of the second communication.

16. These are Assigned Amount Units, Removal Units, Certified Emission Reductions, temporary Certified Emission Reductions, Long-term Certified Emission Reductions, and Emission Reduction Units.

17. Article 10 of the Protocol, which applies to all Parties, requires implementation of national mitigation programs which "would inter alia, concern the energy, transport and industry sectors as well as agriculture, forestry and waste management." Article 2 identifies a suite of desirable policies and measures for Annex I Parties, but the list is exemplary, not mandatory.

18. Wealthier Annex I Parties are listed in Annex II of the UNFCCC. These Parties have obligations to provide financial and technological assistance to non-Annex I Parties, which do not apply to other Annex I Parties.

19. Compilation and Synthesis of Fourth National Communications, part II at page 8, UNFCCC. Available: http://unfccc.int/resource/docs/2007/sbi/eng/inf06a02.pdf.

20. While the elements discussed here refer to the CDM, procedures under the Joint Implementation Supervisory Committee (referred to as Track II Joint Implementation) are largely the same.

21. Bodansky and Diringer (2007).

22. The exception was the review of Fourth National Communications of Annex I Parties. Decision 7/CP.11 requested the secretariat to conduct a centralized review of 4th national communications as part of an overall effort to streamline the review procedures in the years 2006-2007.

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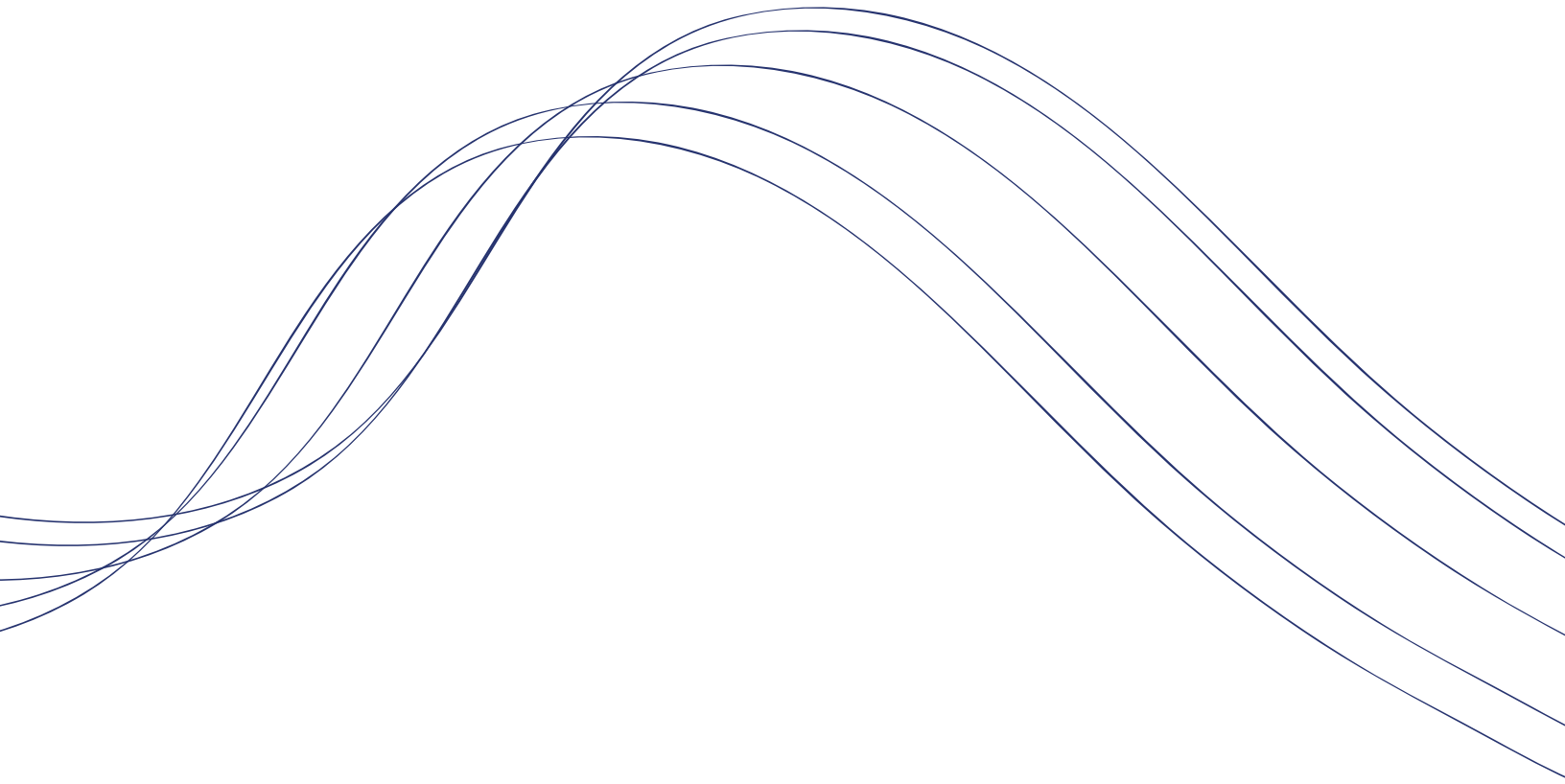
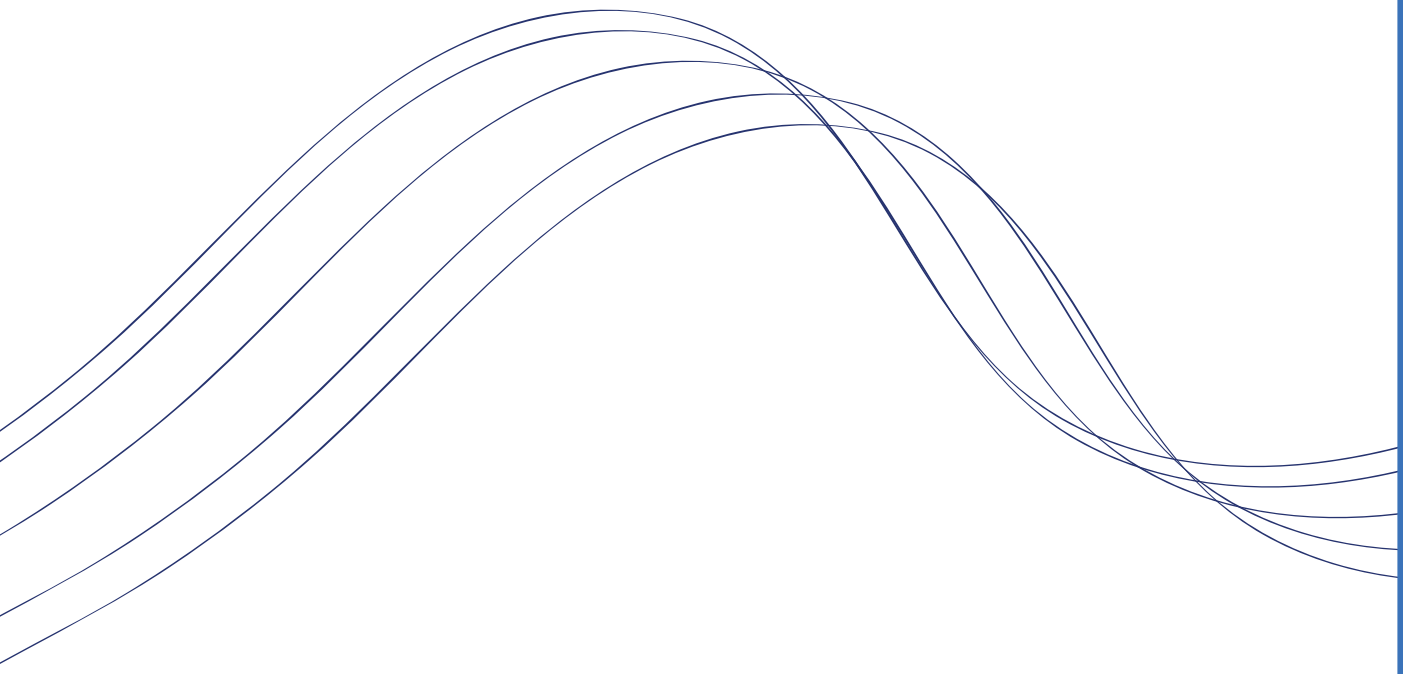


This paper explores options for the measurement, reporting and verification of countries' efforts under a new international climate change agreement, as envisioned under the Bali Action Plan. It is part of a Pew Center series on *Advancing the International Effort Against Climate Change.* The Pew Center was founded in 1998 to bring a cooperative approach and critical scientific, economic, and technological expertise to the global climate change debate. We inform this debate through wide-ranging analyses in the areas of policy (domestic and international), economics, environment, and solutions.



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