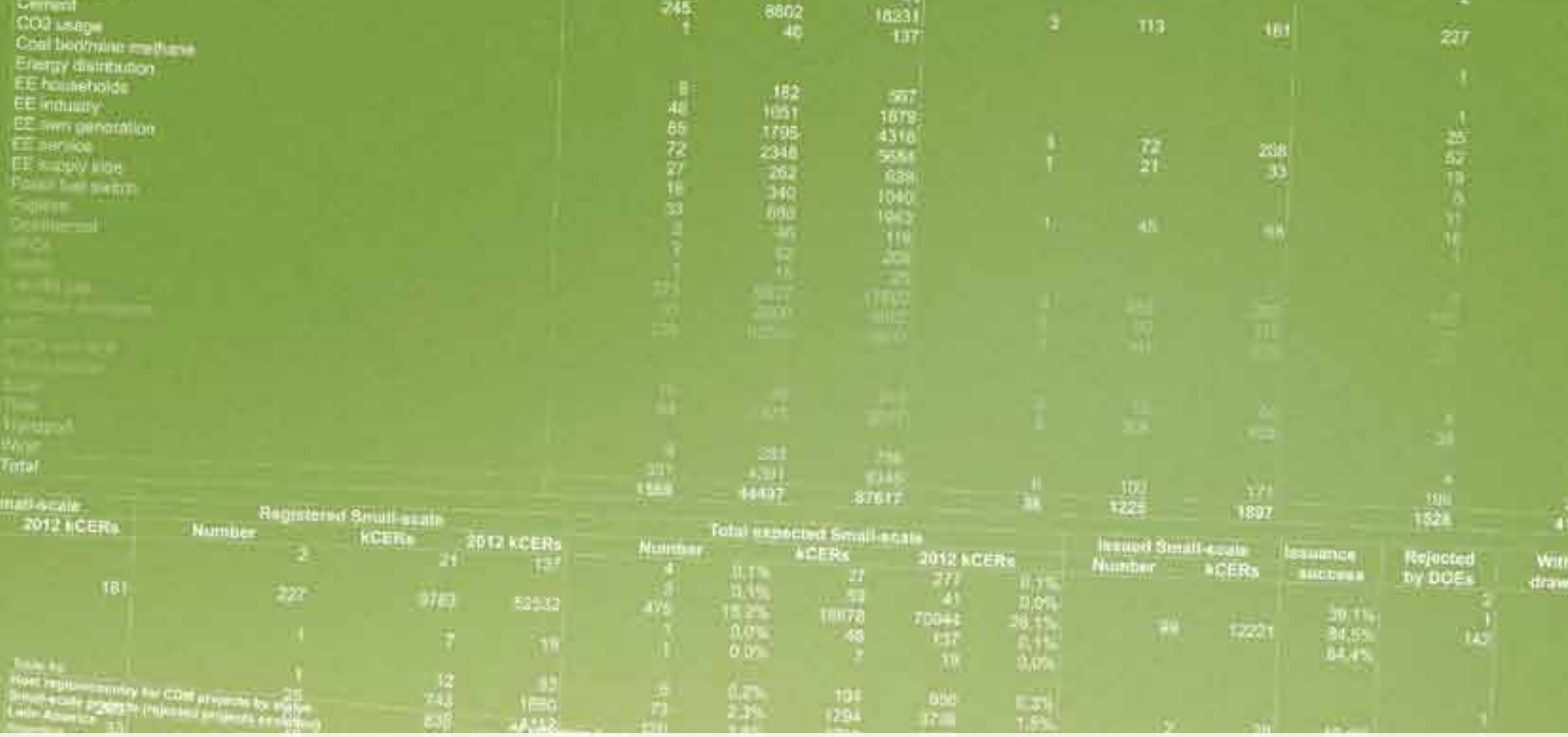
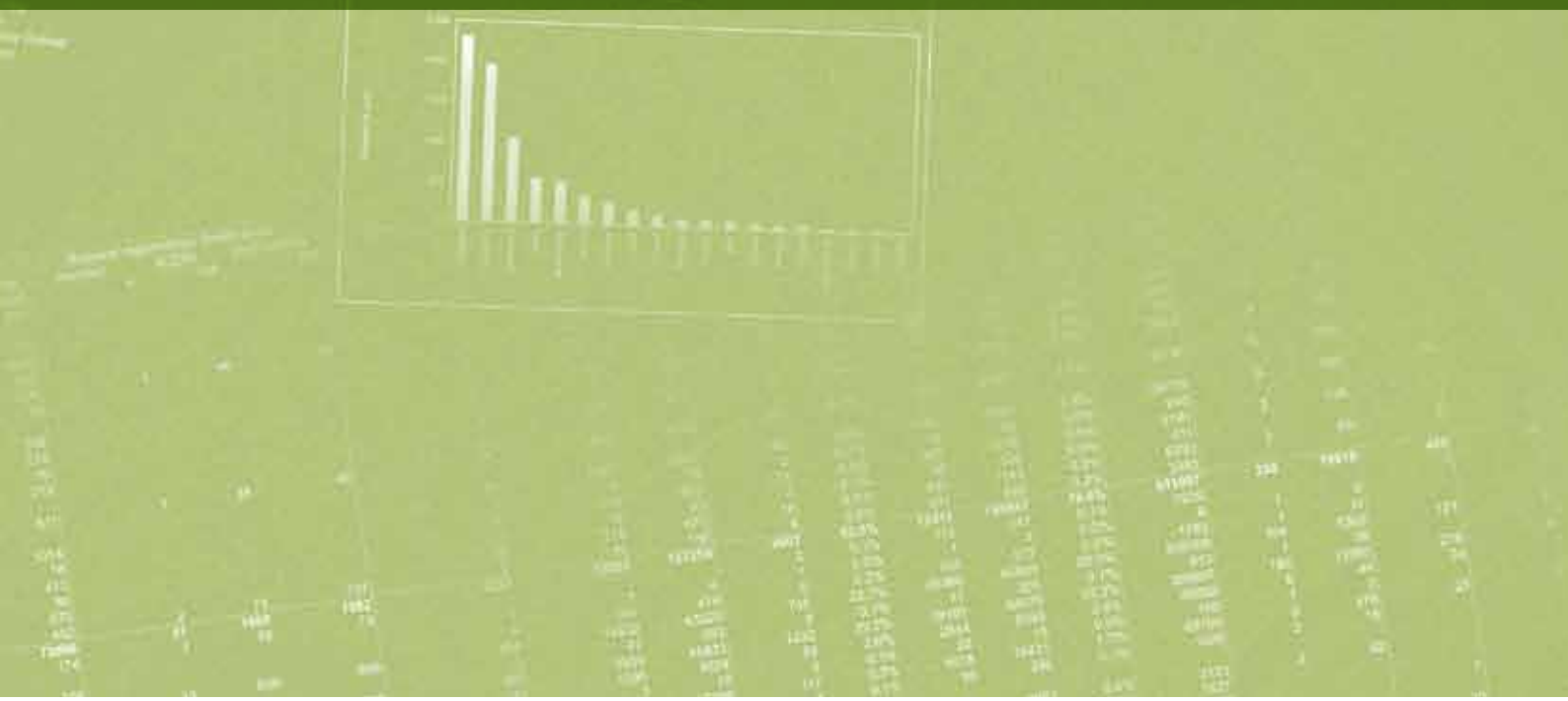


Measuring Reporting Verifying

A Primer on **MRV** for Nationally Appropriate Mitigation Actions



UNEP RISØ CENTRE
ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

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A Primer on MRV for Nationally Appropriate Mitigation Actions

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November 2011

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ISBN: 978-87-550-3949-0
Graphic design: Phoenix Design Aid A/S, Denmark

Acknowledgments

This publication is partly financed by United Nations Development Programme (UNDP)'s Carbono 2012 Programme as part of the special cooperation agreement between UNDP and the UNEP Risø Centre to support Carbono 2012 implementation in Latin America.

Special thanks to Sudhir Sharma from the UNEP Risø Centre, for providing insightful comments to preliminary versions of this publication.

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Foreword

The requirements for measurement, reporting and verification (MRV) of Nationally Appropriate Mitigation Actions (NAMAs) are among the crucial topics on the agenda of international negotiations addressing climate change mitigation. According to the agreements so far, general guidelines for the MRV are to be developed by the Parties to the UNFCCC. The Subsidiary Body for Implementation will be conducting international consultations and analysis (ICA) of biennial reports to improve transparency of mitigation actions.

It is expected that MRV for NAMAs should not be a burden for controlling greenhouse gas (GHG) emissions resulting from economic activities. Instead, MRV process should facilitate mitigation actions; encourage the redirection of investments and address concerns regarding carbon content of emission intensive operations of private and public companies and enterprises worldwide.

Even though all MRV requirements are shaped in the framework of the Convention, there are a number of initiatives supporting developing countries in moving forward with NAMAs development, as an attempt to become exemplar activities. However, how these actions should be fully measured, reported and verified remains uncertain.

MRV is not a new concept and is present in most of the existing policies and frameworks regarding climate change mitigation. With an aim of contributing to the international debate and capacity development on this crucial issue, the UNEP Risø Centre in cooperation with *Det Norsk Veritas* (DNV) is pleased to present this publication. The document builds on existing MRV practices; provides insights on how MRV for NAMAs can be performed and identifies elements and drivers to be considered when designing adequate MRV systems for NAMAs in developing countries.

The UNEP Risø Centre has over the last decade become a leading provider of capacity development, guidance materials and practical tools in the areas of CDM and Technology Planning. This Primer is a second contribution in the emerging area of NAMAs and MRVs. It is complemented by a recent publication on Low Carbon Development Strategies and NAMAs.

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1. Introduction

Nationally Appropriate Mitigation Actions (NAMAs) are revealing itself as one of the fundamental means for boosting social, economic and environmental transformations necessary to promote *low carbon development.* A number of initiatives have emerged testing different approaches to NAMAs. A number of countries have made first submissions to the UNFCCC reflecting initial thinking about NAMAs. Likewise a few studies have made approximations on the definition of NAMAs and many initiatives have gone further in order to pilot NAMAs in several areas. However, promoting NAMAs implies a process with multiple challenges including vested interests, but also opportunities for unleashing new flows of finance from both public and private sources.

One of the main challenges when implementing NAMAs is the requirement for Monitoring, Reporting and Verification (MRV) in ways that are consistent, transparent, comparable, complete and accurate. Putting in place MRV systems with a sufficient level of rigorousness and harmonized with its national circumstances and development priorities requires innovative thinking. More importantly, it needs the provision of official international guidance, which is currently under development, and extensive support for capacity development.

While the Parties to the UNFCCC work on the guidance for MRV and clarify the policy logic behind it, the UNEP Risø Centre and Det Norske Veritas (DNV) have joined forces to develop this publication with the objective of contributing to the international debate and supporting early capacity development activities for both NAMAs and MRV.

It is reasonable to assume that MRV provisions should build on existing experience from emissions reduction efforts, including MRV practices of CDM projects and procedures to quantify and account for emission reductions under carbon offset schemes. Thus, the present publication takes its point of departure in the MRV of emissions reduction rather than MRV of capacity development or the MRV of finance provided or deployed. Moreover, it further considers elements needed to improve the efficiency of MRV for emissions reduction and adjust current practices.

2. Nationally Appropriate Mitigation Actions (NAMAs) and Measuring, Reporting and Verification (MRV)

NAMAs originate in the Bali Action Plan (2007) defining the concept as "nationally appropriate mitigation actions by developing country parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building." The Copenhagen Accord (2009) went on to institute that "Supported NAMAs" - those funded by Annex I (developed) countries - will be listed in a registry and subject to international measurement, reporting and verification (MRV), while the Cancun agreements (2010) had NAMAs aiming "at achieving a deviation in emissions relative to business-as-usual emissions in 2020."

The Cancun agreements clearly recognize a need for a work programme to clarify and operationalize issues like design of the registry, international rules on MRV and improved greenhouse gas emissions reports from non-Annex I parties. However, the negotiation process has not yet produced a final definition and modus operandi for NAMAs. Many attempts to structure and define NAMAs according to different criteria have therefore been made by a sizeable number of stakeholders to the negotiation process. It is important in this context that while negotiation texts (e.g. FCCC/AWGLCA/2010/8) only differentiate between supported and unilateral NAMAs, one of the commonly accepted approaches defines three types of NAMAs:

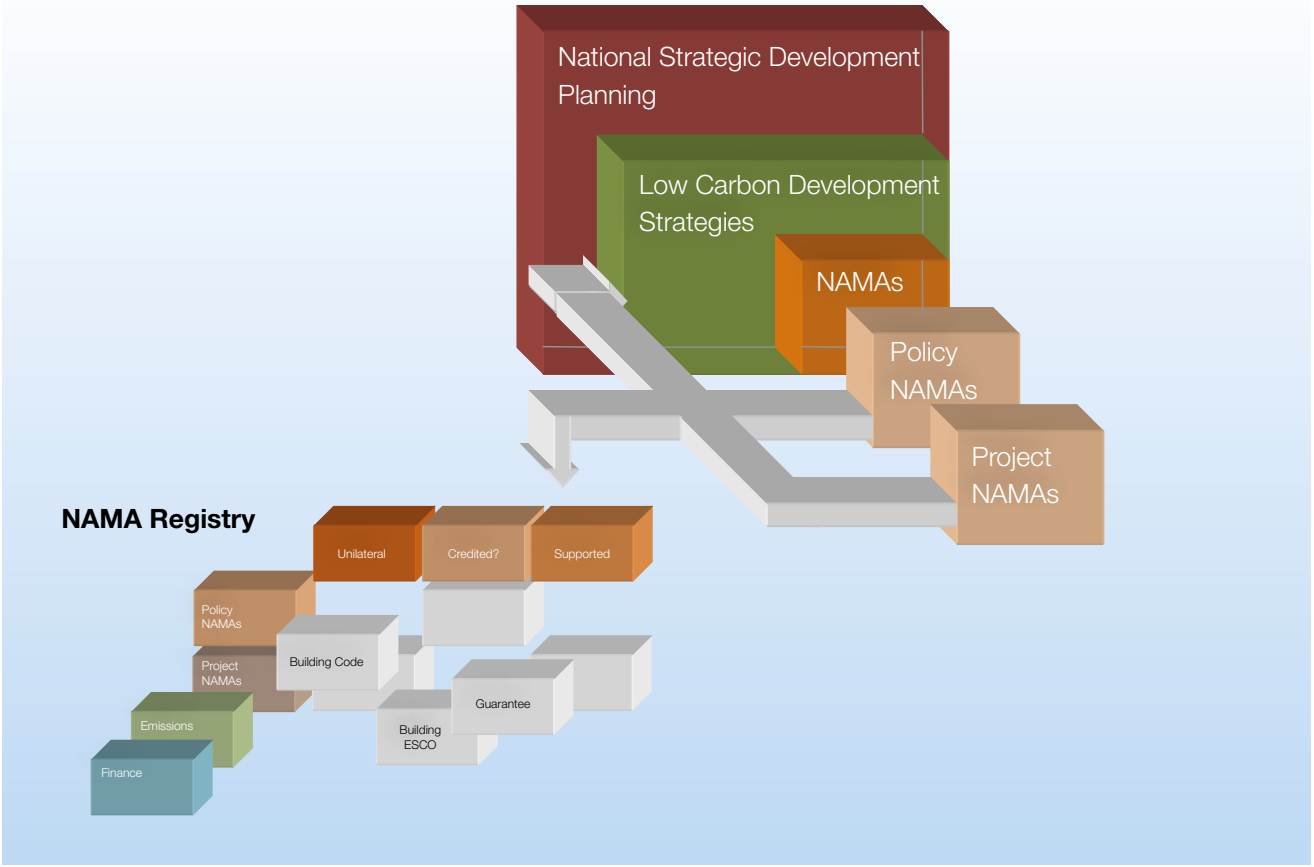
1. Unilateral NAMAs – autonomous actions taken by developing countries to reduce domestic GHGs (domestically funded and unilaterally implemented)
2. Supported NAMAs – actions undertaken with financial, technological and/or capacity development support from developed countries, and
3. Credit-Generating NAMAs – actions that produce credits for sale in the global carbon market. This category is currently not part of the official negotiations.

NAMAs may be further divided into types such as project, sectoral and policy based NAMAs. Elaboration of types of NAMAs succeeds throughout the text to illustrate the differing requirements for MRV systems.

Ideally, NAMAs should emerge from national long term development planning as a result of revisiting current development objectives and priorities with an additional set of criteria focusing on emissions reduction. Thus, such Low Carbon Development Strategies should at the same time frame NAMAs as illustrated in Figure 1.

Under that rationale, Low Carbon Development Strategies (LCDS) are economy-wide exercises that map out reduction options within the framework of current development objectives and priorities, practically pinpointing areas where a shift in priorities or a shift in technology can bring about emissions reduction without jeopardizing overall long term development objectives. NAMAs stem from this process.

Figure 1: NAMAs in the context of LCDS



3. Current MRV frameworks and lessons learnt

The majority of current policies and frameworks related to emissions reduction integrate MRV systems. However, there are differences in the way that MRV systems are perceived. The table below lists a few regimes for emissions reduction and their jurisdiction. The systems of MRV are undertaken at the operational implementation level as well as at the scheme level.

3.1 MRV at the operational implementation level

Under current emissions reduction activities MRV systems are designed and developed with a focus on the implementation level and defining elements such as emission sources, gasses, project activities, baselines and additionality. Installation based MRV systems are generally well understood and implementation of MRV at the installation level is usually clear and transparent. However, this does not withdraw the fact that MRV for installations can be complex and difficult to define and implement. Generally MRV systems can be divided into two different groups:

1. Direct emissions reporting
2. Indirect emissions reporting

Under direct emissions reporting the installation is usually required to install meters that report directly into a dedicated database, whereas the indirect emissions reporting usually relies on the registration of emissions that are verified before being released as final emissions data. The direct emission reporting offers the advantage of complete and accurate data for the government and the need for specialized in-house MRV expertise at installation level is kept at a minimum. On the other hand, experience shows that although meters are installed and function correctly, it is not always that all emission sources are initially identified and metered by the installation, thus resulting in incomplete emissions

Table 1: Current emission trading platforms

Scheme Name	Scope	Jurisdiction of operations
Clean Development Mechanism	6 GHG Kyoto Protocol Gasses	UN
European Union Emission Trading Scheme (EU ETS)	CO2 emissions	European Union
Panda Scheme	All GHG emissions, currently focussed on sinks	China
California Climate AB32	6 GHG Kyoto Protocol Gasses	State of California
New Zealand Emission Trading Scheme (NZ ETS)	6 GHG Kyoto Protocol Gasses	New Zealand
South Korean Emission Trading Scheme (Korean ETS)	6 GHG Kyoto Protocol Gasses	South Korea
Special Climate Change Programme 2009 - 2012 Mexico and CONAVI NAMA		Mexico
ISO 14064		World Wide

reporting. This may partly be explained by rigid reporting requirements that do not always follow the individual installation's method of operation.

Indirect emission reporting such as in the CDM and under the EU ETS allows flexibility between the different individual installations since they can normally introduce local variations in how they obtain the relevant data. At the same time, however, the system is quite demanding on the installations. Hence specialized experience has to be developed or brought in to work effectively. This is particularly true when the installation has to interpret a methodology in order to be in compliance with its monitoring and reporting requirements. As a consequence an MRV system that relies on indirect emission reporting normally also requires a considerable amount of supportive documentation that assists the installation undertaking monitoring and reporting, as well as the verifier performing the verification.

3.2 MRV at the scheme level

At the scheme level MRV requires the definition of boundaries, objectives and incentives to implement the scheme successfully and to monitor, report and verify accordingly.

There are obvious cultural differences in the ways laws and regulations are designed and formulated. When looking for instance at the United States of America and the European Union, two regions almost identical in development and legislative capabilities, their MRV systems are quite different at the scheme level. The US legislation is detailed; outlining paragraph by paragraph the requirements and the conditions under which companies can comply and potentially will be penalized, almost prescribing business conduct. The EU legislation, on the other hand, tends to be more open in its description and leaves it up to the industry to operate according to the local circumstances.

The difference between these concepts is also reflected in the MRV frameworks used. The US system tends to be more uniform for all installations compared to the EU system, which is more diverse in its implementation at installation level. In addition, MRV is more constrained by the national data protection in EU, because the EU is a group of sovereign Parties, whereas in the US, the federal government can impose more easily, even though the individual States have a certain level of autonomy, for example when it comes to the central data collection.

Such differences in legislative traditions will probably be even more outspoken in the very diverse group of developing countries, obviously leading to significant differences in how MRV for NAMAs are developed.

Another obvious difference between the existing schemes is their specific scope, i.e. what particular parameter they are set to monitor, report and verify. Section 4.4 further elaborates the impacts of boundaries for projects, programmes and policies. In order to be effective, each scheme must define its operating scope, which also clearly determines who and what is affected by the scheme. Since each NAMA and scheme will have different objectives their scopes will vary widely.

In schemes that focus on installations, each installation may have its own monitoring and reporting that require verification before it is included in the overall assessment of the scheme. Also in schemes that are policy based there is ultimately an operational implementation level that results in MRV requirements. For example, in order to enhance energy efficiency a scheme may provide a tax incentive for household appliances of a certain energy efficiency class. In this case MRV will have to focus not only on the number of units sold but also on whether the tax incentives are correctly applied only to compliant appliance.

3.2.1 Authorities, Responsibilities and Accreditation

Although usually monitoring plans are prepared at the installation level and the verification body checks the compliance against this monitoring plan, under the EU ETS, for example, it is the competent authority that is responsible for confirming that the design of the monitoring plan meets the EU ETS requirements. If applied to NAMAs development, it suggest that the ultimate responsibility for implementation and control of NAMAs will lay with the Host Country assigning clearly defined authorization and responsibilities to the institutions working within the scheme. This is particularly important under the assumption that NAMAs will generally be spread over a number of different ministries within the host country, as well as industries with varied MRV experience.

Further, accreditation is a critical part of any MRV system as it outlines not only who is responsible for the verification of the Monitoring Reports but also defines the competence of the personnel and/or system. Under the existing schemes MRV systems have relied on the accreditation of third party auditors. However, other types of accreditation can be applied.For example. an accreditation module that relies on either first party or second party auditors. Even assigning a government body to perform the verification constitutes a level of

accreditation, although third party verification is generally regarded as more reliable, not least because more direct competency requirements can be imposed.

3.2.2 Penalties & Pass / Fail Conditions

Existing schemes currently in place all have a pass/fail condition defined. Without these conditions, no effective MRV can exist. If there is no consequence of failing to meet requirements, verification looses its purpose. However, the effects of the pass/fail conditions can differ. Failing the MRV in the EU ETS would normally result in a penalty of EURO 100 per tonne of CO_2 emitted above the allowable level, whereas in the CDM failing to follow the approved monitoring plan would lead to a non-issuance of CERs. While these pass/fail tests are ultimately guarding the environmental integrity of a scheme they have been one of the most debated issues among stakeholders in any of the schemes currently in operation.

4. MRV Building Blocks

By definition, designing effective MRV frameworks for NAMAs means putting into place frameworks in order for measuring, reporting and verification to be practicable and achievable. Generally, measurement is a prerequisite for verification. Measurement requires a measurable unit to be identified and recorded, and those records to be made available for verification through reporting systems. The following discussion considers the various aspects that can be measured, and is intended to provide a basis for designing building blocks for MRV systems. The building blocks are not category specific, except for the additional requirements for international reporting and verification of creditable and supported NAMAs. The building blocks are not category specific, except for the additional requirements for international reporting and verification of creditable and supported NAMAs.

Although emission reductions from internationally supported NAMAs will not be sold on the carbon market and do not compensate for other emissions in Annex I countries, institutions providing funds to NAMAs will require MRV systems to ensure that funded NAMAs are contributing to GHG emissions reduction. Therefore, emission reductions resulted from internationally supported NAMAs will need to be quantified to the best extent possible. While GHG emissions reduction benefits can be easily quantified for NAMAs with easily measurable emissions reductions, for many policy-related NAMAs quantification will be more difficult.

The metrics for NAMAs effectively fall under two primary categories: quantitative and qualitative.. In addition, metrics can be categorized as inputs acting towards GHG mitigation or the outputs of mitigation activities in terms of real measurable GHG reductions. For example, input metrics might include a number of activities established, programmes implemented or units constructed in an effort to reduce greenhouse gas emissions, while output metrics would include, for example, the amount of diesel fuel replaced by natural gas in a public transport NAMA, from which it might be possible to calculate actual GHG emission reductions. The range of metrics applied to a NAMA could, and in many instances should, include quantitative and qualitative, input and output metric types. Metrics may include data from both donors and recipients.

4.1 Quantitative Metrics

Quantitative metrics are metrics for variables which can be measured using standard units of measurement and may include financial, technical and process data.

4.1.1 Quantitative financial metrics

Financial metrics include the financial flows from donor institutions to recipient institutions or organizations, and from those institutions to funded activities and operations. Their usefulness in respect of NAMAs is primarily to ensure the efficacy of funds in conjunction with one or more supplemental metrics. Financial metrics therefore on their own will be unlikely to demonstrate real reductions in emissions, but will form part of a mix of metrics useful for assessing the performance of supported NAMAs. In particular, these metrics will allow for the assessment of the cost effectiveness of NAMA activities. Funding through the prospective Global Green Fund or the Global Environment Facility is likely to be much easily accounted for at the international level, while funding provided through less straightforward channels may be more difficult to measure and verify. Funding institutions may choose to carry out their own auditing of funding flows and there may be an opportunity to rely upon some of the new climate fund standards that have been developed such as the Climate Bond Standard by the Climate Bond Initiative[1]. The outcomes of third party MRV related to those standards could potentially be incorporated at the broader international level.

Measurement of financial metrics is relatively straightforward. Data systems and record keeping arrangements for investment flows are usually already in place. The key element is to ensure that procedures are in place to secure that funds are allocated to activities and projects which are included in the particular NAMA.

4.1.2 Quantitative Process Metrics

Quantitative process metrics include activities which are procedural in nature and can be measured in terms of numbers of activities completed. Quantitative process metrics are relatively simple to document, record and report, provided that appropriate administrative practices are established to ensure that thorough documentation is kept. Quantitative process metrics are unlikely to

1 http://climatebonds.net/

require significant capacity building and do not demand sophisticated data management systems. They are therefore relatively easy to implement. However, like quantitative financial metrics, quantitative process metrics are input metrics and do not provide any indication on their own of NAMA effectiveness or GHG emissions mitigation quantification. They are primarily used to guarantee the efficacy of processes and programmes in conjunction with one or more additional metrics, and to demonstrate that a NAMA is functionally operating as planned.

Examples of quantitative process metrics include documenting and reporting on the creation of new institutions or working groups, meetings held or progress in educational programmes.

4.1.3 Quantitative Technical Metrics

Quantitative technical metrics may be input or output based. Input technical metrics are, for example the number of renewable energy installations. Output technical metrics are the GHG emissions reduction measured at an installation. The MRV frameworks for CDM and JI are quantitative output technical metrics, and are well elaborated.

Technical metrics are the most challenging to document, record and report. Quantitative technical metrics may require significant capacity building and would usually require sophisticated data management systems. Technical metrics may be either input or output metrics; however, output metrics have the capacity to provide the clearest evidence of GHG reductions. On the other hand, they can be the most costly to measure and verify. They may also exhibit the characteristics of uncertainty, error and poor accuracy.

4.2 Qualitative metrics

Qualitative metrics are metrics for variables that cannot be measured using standard units of measurement and may include financial, technical and process data.

4.2.1 Qualitative Process metrics

Qualitative process metrics include assessments of the efficacy of activities undertaken and are procedural by nature. Although qualitative process metrics are more difficult to document, record and report, they are not likely to require significant capacity building and do not demand sophisticated data management systems. Qualitative process metrics will still be relatively simple to establish and implement. However, qualitative process metrics will require significant local review and audit processes as part of the MRV development process. Like quantitative process metrics, qualitative process metrics are input metrics and do not provide any indication on their own of NAMA effectiveness or GHG emission mitigation quantification. They are primarily used to ensure the efficacy of processes and programmes in conjunction with one or more other metrics, and to demonstrate that a NAMA is functionally operating as planned.

Examples of qualitative process metrics include documenting and reporting on the progress and outcomes of new institutions or working groups, actions implemented as a result from meetings held, and measurable competency improvements as a result of progress in educational programmes.

Table 2 below summarizes the benefits and disadvantages of the metrics discussed above for MRV.

4.3 Baselines

Many countries have submitted pledges to the Copenhagen Accord in the form of a reduction target compared against a business as usual scenario. At the macro level this corresponds to setting a baseline, i.e. projecting a probable emission trajectory if no action beyond business as usual is taken. If projections are the result of sectoral assessments and not less specific extrapolations of economic growth and emission intensity expectations, they could constitute baselines against which sector initiatives could be measured. The point of departure for such baselines is an inventory of emissions, such as is expected in future biannual reports, though an entire inventory of aggregate emissions among all sectors is, of course not necessary if only emissions reduction in one or a few sectors are proposed. Therefore, a sectoral inventory and baseline are sufficient.

The countries should seek to establish or develop sectoral baseline inventories at the national level if they pursue support, possibly crediting, for sectoral initiatives. Nevertheless baselines may equally be useful for unilateral initiatives, e.g. if domestic emission trading systems are considered[2]. Establishing sectoral baselines is not without challenges. For instance, in countries with different types of NAMAs the effective implementation of one NAMA may impact on the baseline of other NAMAs.

The countries should seek to establish or develop sectoral baseline inventories at the national level if they

2 see Wolfgng Sterk & Florian Mersmann "Domestic Emission Trading Systems in Developing Countries: State of Play and Future Prospects", Wuppertal Institute 2011, where six developing countries with possible domestic ETS are analysed: Brazil, China, India, Kazakhstan, Mexico and South Korea

Table 2: Metrics and merits

Metric	Advantages	Disadvantages
Quantitative Financial metrics	Information available from donors for cross checking Useful for measuring cost benefit of particular NAMA types in particular countries Relatively easy to establish data and record systems Relatively easy to measure, report and verify Can be verified at international level	Does not directly measure GHG reductions May require reporting systems among the NAMA participants
Quantitative Process metrics	Easy to establish data and record systems Easy to measure, report and verify Effective for ensuring activities are progressing	Does not directly measure GHG reductions May require reporting systems throughout the NAMA participants
Quantitative Technical metrics	Useful for measuring cost benefit of particular NAMA types in particular countries Systems are well elaborated in existing UNFCCC CDM modalities and procedures Panel of independent national/international verifiers (DOEs) established	Relatively difficult to establish data and record systems May require complex inventory systems at the national level Difficult to measure, report and verify Requires in country verification Not applicable for many types of NAMAs
Qualitative Process metrics	Easy to establish default data and record systems Based on the procedural assumptions performance relatively easy to measure, report and verify Effective for ensuring activities are progressing	Does not directly measure GHG reductions May require reporting systems throughout the NAMA participants

pursue support, possibly crediting, for sectoral initiatives. But baselines may equally be useful for unilateral initiatives, e.g. if domestic emission trading systems are considered[3]. Establishing sectoral baselines are not without challenges. For instance, in countries with different types of NAMAs the effective implementation of one NAMA may impact on the baseline of other NAMAs.

4.4 Project, Programme and Policy Boundaries

It is essential when proposing NAMAs to consider the boundaries of a given initiative. The diversity of possible NAMAs means, however, that boundary setting may be complex. While some boundaries may be geographical, others might be sectoral, and yet others might be policy related. If such NAMAs overlap, it must be determined to which NAMAs the result of a given action is attributed. This is particularly crucial for supported NAMAs – and indeed for credited NAMAs – as double counting should be avoided. Transparency in measuring and reporting of performance is a first precondition for addressing such issues in setting and observing boundaries. Coordination between institutions responsible for overlapping NAMAs is equally important.

Some inspiration for the setting of boundaries may be found in the current CDM methodologies, particularly with relevance for project NAMAs and for programmes of activities. Boundary setting for sectors could equally find inspiration here, while for policy-based NAMAs there would be a need for the detailed assessment of expected effects and the attribution of these effects to one or more NAMAs covering the same area of intervention. Boundaries should generally be established applying the same unit, essentially emissions reduction. If not, it would be difficult to distinguish the effect from different NAMAs.

3 see Wolfgang Sterk & Florian Mersmann "Domestic Emission Trading Systems in Developing Countries: State of Play and Future Prospects", Wuppertal Institute 2011, where six developing countries with possible domestic ETS are analysed: Brazil, China, India, Kazakhstan, Mexico and South Korea

4.5 Data requirements

Obviously, MRV systems will be measuring, reporting and verifying data that are collected and kept according to procedures agreed either at the international level by the COP or at the bilateral or national level for a specific NAMA. For all NAMA types, and for all types of data, the diversity of which has been indicated through the former sections, data collection and evaluation processes should be transparent and retraceable. Data collection systems which are portable across NAMA types and sectors will need to be established as an integrated part of NAMA design and implementation.

The nature of the data is indicated in Table 3, that shows how the metrics described above might be applied to examples of types of NAMA implicitly also pointing to the sources of the data. Time series of data would equally be important, though these naturally will have to be accumulated over time for those types of data that are currently not recorded or collected. The data collected would feed into the biannual reporting routines, yet to be established.

Table 3: NAMAs and metrics

Example NAMA	Quantitative Financial metrics	Quantitative Process metrics	Qualitative Process metrics	Quantitative Technical metrics
Capacity development NAMA	• Donor investment and recipient fund allocation for capacity development	• Establishment of data and record keeping systems at national level	• Quality of data system	
Building energy efficiency	• Donor investment and recipient fund allocation for retrofitting of buildings • Cost of retrofitting office buildings per square metre	• Number of buildings with energy management systems implemented • Number of energy efficient devices installed	• Assessment of behaviour-based energy management outcomes following training	• Reduction in energy use in buildings with an implemented energy management system • Recording the “power” of the device installed (as per CDM methodology) • Metering the “energy use” of an appropriate sample of the devices installed (as per CDM methodology)
Sectoral emissions reductions programme	• Donor investment and recipient fund allocation for technology diffusion	• Establishment of sectoral inventory including baseline and reporting systems	• Quality of sectoral inventory including baseline and reporting systems	• Estimated reduced avoided emissions (t-CO2 eq) at the facility level • Estimated reduced avoided emissions (t-CO2 eq) at the sector level

5. Institutional Architecture

Since the Kyoto Protocol in 1997 the institutional environment supporting the emissions reduction agenda has evolved dramatically. So have the capabilities among stakeholders not only in terms of identifying emissions reduction options, and exploiting them, but also reporting on results achieved. One of the key drivers in this respect has been the CDM. The operationalization of the CDM has required the establishment of a multifaceted promotion, support and registration system and institutions. In parallel various companies and NGOs have been learning and developing capacity.

Only few elements of the institutional structure to support the NAMA/MRV system have been elaborated as part of negotiations. The following, therefore, only outlines possible scenarios based on the experience and lessons learnt from existing mitigation programmes.

5.1 National Level Institutions

Ultimately, all emissions reduction activities materialize at the national level where activities can be initiated regulated and enforced. Developing country Parties have already been contributing to emissions reduction tangibly through the CDM activities. The introduction of NAMAs will facilitate more concerted emissions reduction efforts.

Being relevant to a number of different policy areas and sectors, NAMAs do not relate to one specific ministry or regulatory body. Rather they are anchored to a number of different institutions. The typical structure of a Designated National Authority (DNA), serving as national focal point for the CDM, already mirrors the diverse areas of intervention for emissions reduction and includes board members from all relevant sector ministries. For some countries this makes the DNAs obvious starting points for institutionalizing the future coordination of NAMAs. However, the NAMAs and the MRV system require more than what the current DNAs have been designed for. First and foremost the current DNAs are not established with any authority to influence policy development, only to determine compliance with national priorities of project activities having been proposed by third parties. It is not necessarily possible to reverse this flow of authority. Instead of refurbishing the DNAs with new authorities, it might be more appropriate to establish a Central Coordinating Unit (CCU), which may or may not build on the current DNA structure. If separate the DNA might instead take the form of a 'clearing central' where essential analysis and information is gathered on the coordination and prioritizing of emissions reduction options from different sector ministries – while the current board structures might be more useful for the CCU for high level prioritization processes.

The necessary restructuring of the DNAs into CCUs should also reflect the increased demand for reporting – and a significant diversity in the reporting requirements. For this particular purpose the DNAs are already established as the communication link to the UNFCCC Secretariat and might retain this function. The diversity in reporting requirements is illustrated by a few key dimensions of NAMAs:

1. Different categories of NAMAs: unilateral, internationally supported and possibly credited NAMAs
2. Different types of NAMAs: policy based and project or sectoral based
3. Different types of reporting systems for different types of metrics
4. NAMA linkages

1. Different categories of NAMAs:

Unilateral NAMAs are likely to be within the existing capacities of respective line ministries. Their performance will be measured and probably reported as a part of annual reporting in processes already on-going for other activities and projects. Thus, existing reporting structures will be employed.

Internationally supported NAMAs will require the most elaborate institutional structuring and will probably benefit from incorporating already existing modalities and procedures from administration of development assistance. In many cases this will involve the Ministry of Finance which will keep track of funds available from international sources and the disbursement against purposes agreed, but agreements may also be directly

with line ministries. The challenge is related to linking the assistance to actual implementation of emissions reduction activities.

When developing credited NAMAs, CCUs may rely on the already existing functions of the DNA. Assuming a considerable resemblance to CDM – many tend to think of Project NAMAs as the next level of Programmatic CDM – national approvals will be issued to private operators. It needs to be decided whether issuance of credits should succeed at the national or the international level, or through a two-step process with a national approval first and an international issuance to follow. The purpose of the national approval is to have the national control of the prospective national emissions inventory especially in cases where a national emission trading is established. The CCU should be equipped to perform or require verification of the reductions achieved.

2. Different types of NAMAs:

It is particularly difficult to establish reporting systems for policy based NAMAs since the direct causal links between the policies and the resulting emissions reductions are not always clear. Policies create enabling environments and different sets of indicators must be considered to be able to demonstrate their effects or whether objectives are met. Furthermore, Policy NAMAs can be subdivided into two groups the division of which is not always straightforward. Table 1 is a tentative list of possible measures, divided into those measures that require further action before reporting is feasible (right column), and those that can be seen as actions in themselves, but for which quantification may be difficult but for which the host country has allocated resources for its implementation (left column).

The easiest distinction between the two is that those initiatives that are actions in themselves seem to be mostly of a financial type. For these, financial reporting is most obvious, though the financial reporting cannot stand alone as described earlier. The initiatives that require further action before they become measurable are related mostly to target setting. Additional steps, either at the policy or at the project level, are necessary before any actual reductions take place and reporting becomes relevant. While the latter, obviously, does not require any institutional setting at this time, the policy actions are either linked to line ministries (e.g. grants from ministries of agriculture, environment or energy) or economic ministries (tax exemptions from Ministry of Taxation or guarantee schemes from the Ministry of Finance). The CCU, or a DNA, may be equipped to collect reporting from these ministries, which may be more practicable than the ministries themselves reporting individually to the international level (if applicable).

Target setting is particularly relevant for introducing sectoral approaches based on either sector no-loose targets with less stringent MRV approaches or benchmarking and measurement of individual installations' performance against the benchmark. In these systems

Table 3. Policy NAMAs

Policy NAMAs that represent action	Policy NAMAs that require action
Grants (budget allocation)	Energy efficiency target
Direct payment (budget allocation)	GHG emission target
Fixed payment (budget allocation)	Renewable energy target
Additional payment (eg. budget allocation for feed-in tariffs)	Other quantitative targets/obligations
Public procurement guidelines	GHG emission below BAU level
Tax credit	GHG mitigation target
Tax reduction/exemption	R&D
Variable or accelerated depreciations	Enhancing forest carbon sinks
Building sector standards	Quota obligations
Labeling requirements for low GHG products	
Removing subsidies to non-RE	
Loan schemes (budget allocation)	
Guarantee schemes (budget allocation)	

emission rights can be exchanged between national installations through a national trading system. Such a trading system could be overseen by the CCU, but probably not hosted by it. Rather it would be managed by a line ministry like industry or energy or other relevant setting in the host country. National trading systems could be combined with a national account of surplus credits (measured against a national objective for reductions) held by the CCU for potential international trades in credits.

3. Different types of reporting systems:

The reporting structures will need to distinguish between emissions reporting and other (proxy) reporting. Over and above the CCU, which could be the central institution for reporting on NAMA implementation, the institutional structure may involve line ministries or sector institutions well positioned to extract quantitative information related to the implementation of activities. Ultimately, it might also link to systems related to financial reporting. The functions need not be merged, but records need to be kept in order to provide the linkages between donor funding, actual disbursement for activities, and pursuant emissions reductions achieved.

4. NAMA linkages:

It is likely that NAMAs will rarely be stand-alone activities. Emerging from a more strategic planning process they will most likely represent concerted actions that include several different mitigation activities and many different sources of funding that all must document their effect. It is essential that these linkages are not lost in the registration and reporting on each single NAMA. In many cases such concerted actions involve more than one governing institution and will lead to activities that involve a range of different stakeholders. The delay or overachievement of one NAMA may directly affect the implementation of another. Keeping track of activities, with a view to coordinating these activities and optimizing their impact, requires transparent reporting systems. This could be logically anchored with the CCU. Open access databases are an option that would link ideally with the central UNFCCC NAMA Register.

Based on the above, the set-up of the CCU will probably have to accommodate the following requirements:

- It must incorporate reporting from all line ministries and their regulatory bodies and keep a constantly updated registry of relevant policies and projects
- It must possess the capacity, in collaboration with the line ministries, to record the effects of regulatory initiatives (policy NAMAs that are actions in themselves) compared to a baseline scenario
- It must have sufficient knowledge to oversee the application of relevant methodologies for assessments of emissions reduction from concrete project activities - and sufficient capacity to support national and international verification teams
- It must be able to devise, respectively employ, principles for distribution of reduction effects of related NAMAs
- It must gradually build up a national emissions inventory to facilitate easy biannual reporting to the UNFCCC Secretariat of overall progress

Further, to the extent that financial reporting is agreed to be a proxy for demonstrating effectiveness of a NAMA, the CCU must have access to, and authority to report financial flows to policy schemes from both national and international sources (e.g. the Green Climate Fund), including actual disbursements.

NAMAs are supposed to be based on technology, finance and capacity development, most of which is envisaged to origin from developed countries. While the capacity development in all likelihood will continue as part of (additional) development assistance and follow the current means of implementation, the finance and technology platforms for NAMAs will be formalized as parts of a future international agreement. A network of technology advisory centers has already started to emerge and a Green Climate Fund is foreseen as the institutional framework, over and above direct bilateral assistance, to providing (significant) financial support. In addition, therefore, the CCU should also

- be equipped to keep track of capacity development efforts, domestic (unilateral) as well as foreign
- keep track of technology transfer based on a clear definition of transfer of technology
- keep track of multilateral and bilateral assistance and financing flowing to the national level

5.2 International level Institutions

It was decided in Cancun to set up a registry to record Nationally Appropriate Mitigation Actions seeking international support and to facilitate matching of finance, technology and capacity-building support for these actions. Further, it was decided to establish a separate section of the registry to recognize unilateral NAMAs of developing countries. The structure of the registry is not yet established, but it is clear that an international NAMA registry will be established within the UNFCCC Secretariat where developing countries will submit their pledges as well as their requests for funding for supported NAMAs to the UNFCCC.

This is where the international assistance will be recorded and matched against proposed mitigation actions. It includes the support made available by developed countries and will show the support received for individual NAMAs. The Registry can be illustrated as an information matrix like the one shown in Figure 2 – with additional registry options for matching finance. The information in the Registry can be useful in assessing the impact of actions and the level of support globally.

The NAMA Registry that is to be established by the UNFCCC Secretariat will include not only the categories presented in Figure 2, but probably a few more. The three examples of NAMAs presented together in Figure 2 form a holistic approach to the emissions reduction potential in the building sector. It illustrates:

1. a unilateral policy NAMA measured in emissions (building code),
2. a credited project NAMA measured in emissions (building ESCO), and
3. a supported policy NAMA measured in finance (guarantee).

Only if implemented together they will be efficient – hence the demand for illustrating linkages between NAMAs. The real challenge, however, is to attribute results to one or the other part of the concerted NAMAs. Options for reporting finance on one and emissions on another part entail the risk of double counting (ref. section on boundaries earlier).

The UNFCCC Secretariat already maintains the CER registry for CDM projects and hence already has an infrastructure to the extent that project related NAMAs will have the option of generating off-sets. Moreover, the Secretariat already has the affiliation of the Methodology Panel that reviews CDM methodologies. The Methodology Panel's expertise may equally be relevant for developing NAMA reporting methodologies.

Further affiliated to the Secretariat is the Accreditation Panel that ensures the professional standards of consultants, which will be equally as important for MRV for NAMAs as they are for the independent verification of CDM project performance. That said, however, there are (at least) two challenges for the Secretariat in assuming this new role:

- It has no experience in reporting on or administering information of a financial character
- It has developed an administrative system for the CDM that does not lend itself to indiscriminate emulation.

As per definition NAMAs are country driven. Standards for national appropriateness, including the appropriateness of formulation, cannot be centrally established and hence there cannot be a vigorous completeness

Figure 2: NAMA Registry

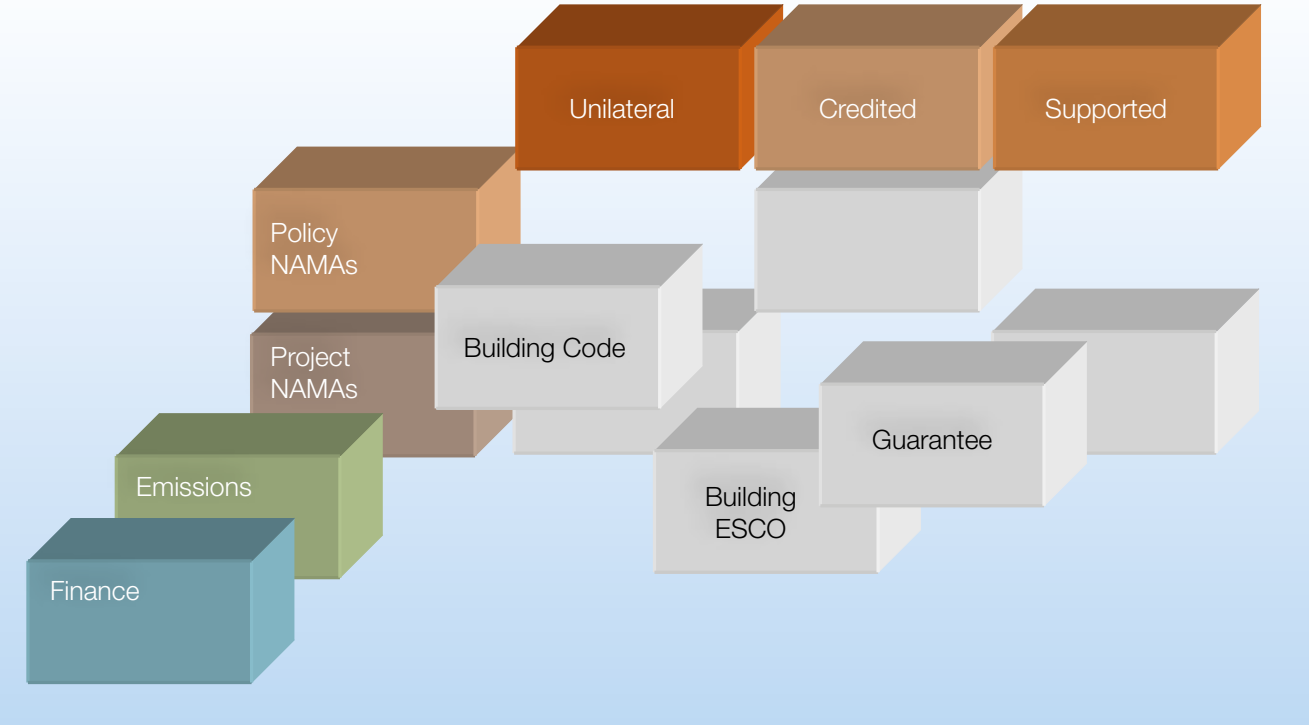
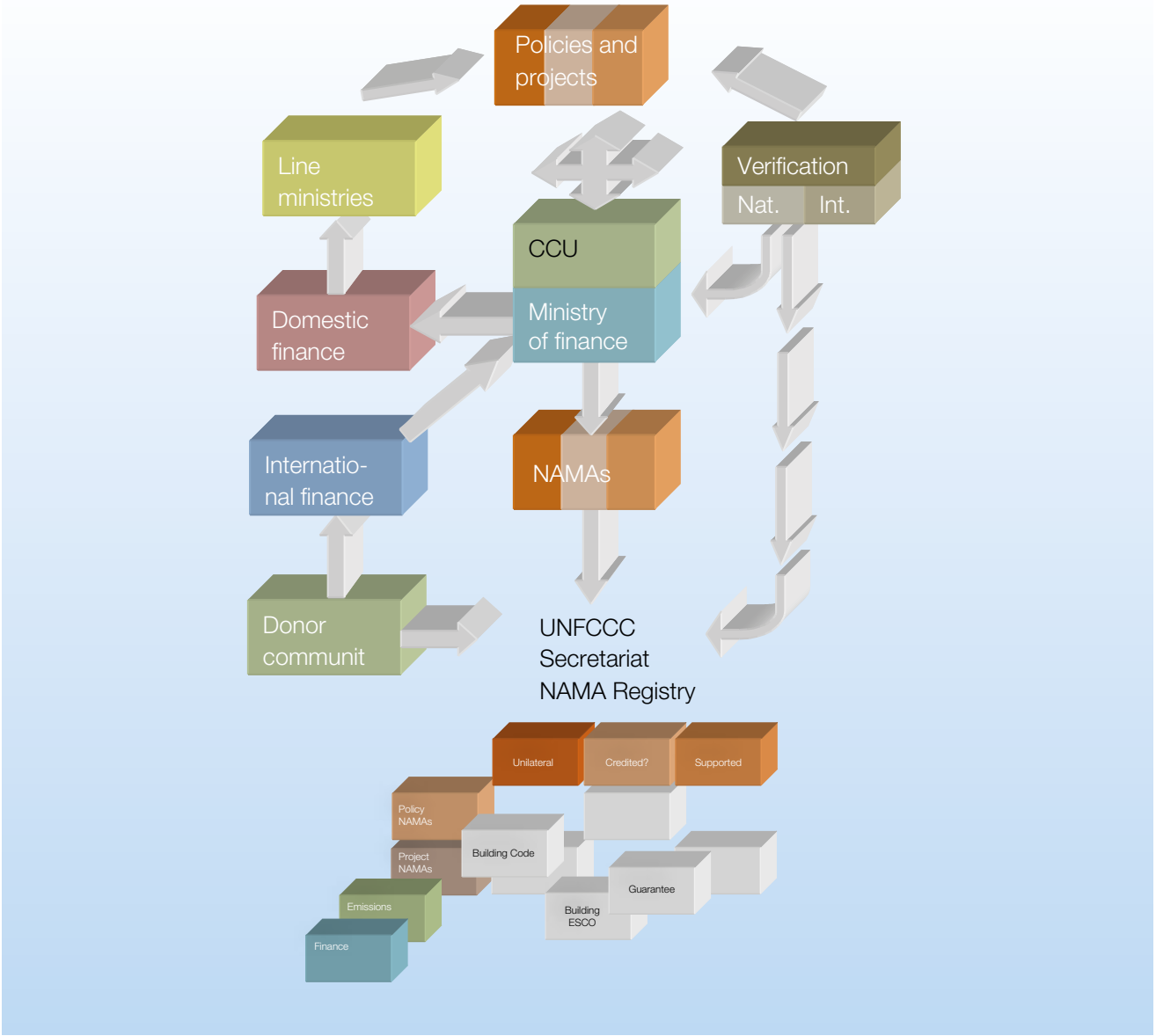


Figure 4: Institutional and functional structure



scrutiny of submissions. There can be guidance at most. As it is already clear from current pledges under the Copenhagen Accord there are immense differences in the approaches to adopting NAMAs. For the system to work, and particularly for the funding mechanisms to function, more details are probably necessary, but it will ultimately be countries' prerogative to decide the national appropriateness of the structure of, and the definition of, the NAMA.

It is indeed possible that MRV systems related to such nationally determined actions will require less rigorous scrutiny of the actual performance of the implemented NAMA compared to current CDM routines. In negotiations between the host country and the funding institutions, be it multilateral (Green Climate Fund or others) or bilateral, the performance, and the performance indicators, will have probably been agreed based on what is 'appropriate' and required, following the applicable MRV standards the typology of which was developed in the 'Metrics' section.

For the same reasons the role of an Executive Board for NAMAs – if such a body is needed – could be different from the current role of the CDM Executive Board. It would not have the same level of the 'executive' authority. It can reject neither registration of a NAMA nor the satisfaction of the Parties to a NAMA, be it unilateral, bilateral or multilateral. It can only provide guidance to the methodology panel as to what seems to pose difficulties for countries when proposing NAMAs and which tools might be helpful. Such functions, however, could equally be fulfilled by the UNFCCC Secretariat without necessarily relying on the Board.

6. Developing Country Capacities and Capabilities for MRV Implementation

If MRV systems and traditions differ between developed countries as described in Section 3.2, the capacities and capabilities in developing countries are even more diverse. According to the final Bali decision 1/CP.13 developing country Parties should take "Nationally appropriate mitigation actions ... in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner." While such mitigation actions may be measurable, reportable and verifiable in theory, it may well fall beyond the means of host countries to carry out such MRV activities in practice depending both on the type of action and the level of administrative capacity of that particular Party (hence the Bali call for capacity development).

The Copenhagen Accord further specifies some important aspects regarding MRV:

- Mitigation actions by developing countries shall be communicated every two years via National Communications
- MRV of unilateral NAMAs will be conducted domestically
- Supported NAMAs are subject to international MRV according to guidelines by the COP

The purpose of MRV of NAMAs is to ensure stakeholder trust in their implementation and performance against targets and objectives set. Verification of progress may be required for National communication or in relation to for example performance based payments.

Countries differ in abilities and capacities for establishing institutions necessary to perform the above mentioned reporting tasks. It is, however, more a question of performing the task rather than putting the institutional structures in place, since no additional institutional structures are required. The DNA remains the central institution, which has been established in almost all countries. The ultimate institution for financial reporting will be the Ministry of Finance. It is needless to say that also an existing governmental structure will remain. The difference may be that not all countries have sufficient resources and systems to adhere to the necessary reporting rules. In that case it would be necessary to accommodate external assistance within these existing administrative structures – partly to develop capacity to establish such rigorous routines and capabilities, but in the short term rather to provide the full-time technical assistance to ensure the actual reporting. Such assistance could reduce differences in the quality of reporting among countries and thus avoid the risk of exacerbating already existing biases in financial flows from developed to developing countries – a (justified) concern for the design of the CDM.

The capacity and capabilities of developing countries to implement these MRV frameworks will differ. It is, of course, not a question of sufficient capacity and funds to undertake NAMAs and MRV or insufficient capacity to do so. It is a gliding scale that differs from country to country depending on which is the type of NAMA and in which sector of the economy is it to be implemented. It could be considered to categorize countries depending on their respective capabilities and capacities, for instance:

1. Full capacity, i.e. national MRV systems in place (or to be put in place) that are sufficient for international reporting and immediately underpin both supported and credited NAMAs

2. Good capacity, but still requiring capacity development to support international verification of supported and/or credited NAMAs
3. Limited capacity that requires significant capacity development both for national MRV processes as well as international MRV

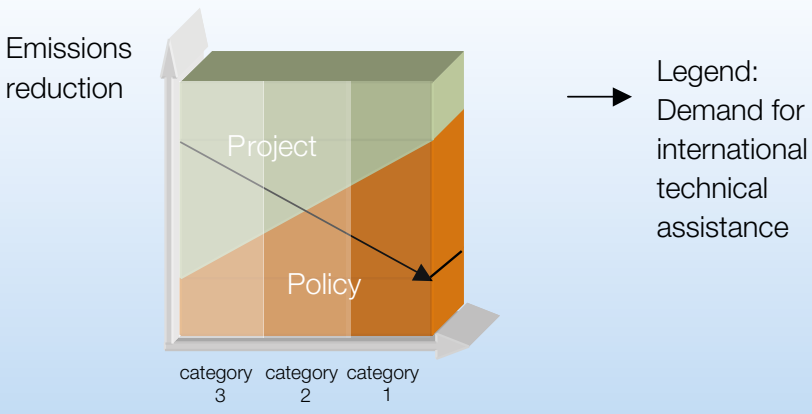
The categorization can be made by using proxies, e.g. different indices, to determine the capacity and capabilities of a country. For instance indices such as the Human Development Index (HDI); Transparency International's Index or Worldwide Governance Indicators (WGI) by World Bank may give an indication of the institutional capacities of a country. Another differentiating factor could be current environmental law enforcement. The issue is, however, not the country's capacity, but its demand for funding which determines the requirements in terms of MRV.

Figure 3 illustrates the probable weight of activities divided between policy NAMAs and specific project NAMAs as a function of the national capacity to administer MRV systems. Countries that adopt a project based approach with fewer strategic elements and a more immediate focus on implementation of projects with multiple benefits, including that of emissions reduction, are to the left in Figure 3. In these countries, probably to be found in category 3 above, policy options are relatively few and enforcement structures relatively weak. Instead, they might concentrate on options in activities which have obvious parallels to CDM Programmes of Activity (or stand-alone CDM projects), thereby may benefit from existing MRV structures, methodologies, and/or an existing service supplier network. However, if a supported NAMA structure instead of a crediting model is the basis for such project activities it could (possibly) employ less stringent verification regime.

To the right in Figure 3 are countries that focus more on policies, which – to the extent that they represent actions in themselves – mostly will lend themselves to reporting by proxies or qualitative process metrics and subsequent tracking of emissions reductions stemming from these initiatives. Such MRV structures do not yet exist and inspiration may be sought in current practices for budget support in general development assistance. This particularly goes for the countries that find themselves in the centre of Figure 3; countries with some capacity and potential for both policy and project NAMAs, but requiring funding for both and still being recipients of development assistance – countries that probably would fall in category 2 above.

It must be emphasized, however, that the distribution is not *because* of the capacity situation per se, but rather because, according to current circumstances, the project approach might be more nationally appropriate in an overall assessment for countries with less administrative capacity.

Figure 3: Countries' choice of types of NAMAs



7. The way forward in designing rigorous MRV systems

Establishing guidelines for MRV systems intended to support the implementation of Nationally Appropriate Mitigation Actions, the definition of which still remains undecided, is not straightforward. Elaborating pathways to take us from the present to a situation with well-established NAMAs and MRV systems is even more challenging. The overarching principle of national appropriateness, however, is probably the guiding light by which each country will find their way, not following a top-down prescriptive approach, but determining first the national appropriateness of mitigation actions; the means of implementation and finally the way in which MRV systems that provide evidence of performance in a sufficiently rigorous manner can be devised. Therefore, it is not the MRV options that determine the feasibility of a NAMA, but the feasibility of the NAMA that determines the possible MRV structure.

There will probably be no two countries that follow the same pathway. Hence pathways. The challenge here is that not all pathways are equally long. Some will take the highway, and some may use a longer and winding road, thus obviously not reaching the point of 'readiness for implementation' at the same time. This could jeopardize the emissions reduction objectives in the sense that obvious reduction options are missed or delayed. More importantly it could jeopardize the equal access to funding.

To (partly) mitigate this, the 'nationally appropriate pathways' could be guided by the setting of milestones at the international level. While the timing should be fixed at a global level, the milestones should not be normative. Rather they should define the level of progress towards an end goal, which is derived from the elaboration of a Low Carbon Development Strategy (LCDS). UNEP Risø has developed a Primer on LCDS in parallel to this Primer on MRV that sets the fundamental principles for LCDS and NAMA design, though much remains to be elaborated.

The setting of milestones might also be helpful in determining the need for capacity development and, thus, also the prioritization of efforts to build this capacity. Following the principles lined out in this Primer this may also include filling in the temporary capacity gaps through the provision of external assistance to ensure that the differences in 'arrival times' at the point of readiness is reduced to a minimum.

Therefore, it is obvious that the pathways for MRV cannot be seen in isolation. It is integrated with the entire process of establishing national LCDSs and NAMAs and probably only becomes relevant in the end phases of the process, reflecting the above indication of a 'NAMAs first' principle. Nevertheless, only informed exchanges will bring the process forward, and it is the hope that this first MRV Primer will be inspirational especially for the understanding of what in a future climate regime will need to be measured, reported and verified to ensure the continued concerted effort in combating climate change.