



NATIONALLY APPROPRIATE MITIGATION ACTIONS:

Key Issues For Consideration



UNDP ENVIRONMENT & ENERGY GROUP CLIMATE POLICY SERIES



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Capacity development for policy makers: addressing climate change in key sectors

The UNDP Environment & Energy Group project, *“Capacity development for policy makers to address climate change”*, seeks to strengthen the national capacity of developing countries to develop policy options for addressing climate change across different sectors and economic activities. The overall goals of the project are twofold:

- To increase national capacity to co-ordinate Ministerial views and participate in the processes of the United Nations Framework Convention on Climate Change (UNFCCC), particularly in the context of the Bali Action Plan;
- To assess investment and financial flows to address climate change for selected key sectors and enhance sectoral planning capacity to address climate change.

In support of the first goal, UNDP produced a series of background briefing documents on the four thematic building blocks of the Bali Action Plan – mitigation, adaptation, technology and finance – as well as on land-use, land-use change and forestry. The publication, *The Bali Road Map: Key Issues Under Negotiation*, was published in October 2008 in the six UN languages.

This document, *Nationally Appropriate Mitigation Actions: Issues for Consideration*, was commissioned in 2009 at the request of countries participating in the project to fill a knowledge gap on nationally appropriate mitigation actions (NAMAs), which are referenced in the Bali Action Plan, but not yet clearly defined. **It is important to note that discussions of many of the terms used in this paper are still going on within the context of the UNFCCC negotiations; therefore the use of some terms is speculative. Also, the positions of Parties to the UNFCCC may have changed since this paper was prepared in August 2009. While the authors believe that they have accurately portrayed the positions of Parties, they may not have captured all the nuances intended by Parties.**

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LIST OF ABBREVIATIONS

AAUs	Assigned amount units
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action
BAP	Bali Action Plan
CDM	Clean Development Mechanism
CERs	Certified emission reductions
CGE	Consultative Group of Experts on non-Annex 1 National Communications
COP	Conference of the Parties
ERUs	Emission reduction units
EU	European Union
EU-ETS EU	Emissions Trading System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LCDS	Low Carbon Development Strategies
LCGPs	National low-carbon growth plans
LUCF	Land-use change and forestry
MRV	Measurable, reportable and verifiable
NAMAs	Nationally Appropriate Mitigation Actions
NAPAs	National Adaptation Programmes of Action
NGO	Non-governmental organization
R&D	Research and development
REDD	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
RMUs	Removal units
TNA	Technology needs assessment
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

GLOSSARY¹

Ad-hoc Working Group for Long-term Cooperative Action under the Convention (AWG-LCA): was established in Bali in 2007 to conduct negotiations on a strengthened international deal on climate change, set to be concluded in Copenhagen in 2009.

Annex I Parties include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

Annex II Parties consist of the OECD members of Annex I, but not the EIT Parties. They are required to provide financial resources to enable developing countries to undertake emissions reduction activities under the Convention and to help them adapt to adverse effects of climate change. In addition, they have to “take all practicable steps” to promote the development and transfer of environmentally friendly technologies to EIT Parties and developing countries.

The **Clean Development Mechanism (CDM)** of the Kyoto Protocol allows emission-reduction (or emission removal) projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO₂. These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. The mechanism stimulates sustainable development in developing countries.

GHG inventory – An inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases in a country.

Low Carbon Growth Plan (LCGP): strategic plan to assist the country in shifting its development path to a low carbon and climate resilient economy and achieve sustainable development. It would have a long-term component that includes a strategic vision and a short and medium term component that shows which specific

actions will be undertaken to get on a low carbon, climate resilient pathway.

Measurable is assumed to mean the estimation of the direct GHG emissions reductions achieved by individual NAMAs or at a national level. This estimation would be done following internationally agreed methodological guidance. Measurability could also imply the estimation of emission baselines or business as usual emission scenarios at a national or sectoral level, if agreed to by the COP.

NAMA: nationally appropriate mitigation action such as project, plan, programme or strategy that aims to reduce emissions of GHG in a country or part of a country.

Non-Annex I Parties are mostly developing countries. Certain groups of developing countries are recognized by the Convention as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. Others (such as countries that rely heavily on income from fossil fuel production and commerce) feel more vulnerable to the potential economic impacts of climate change response measures.

National Communications are reports from both Annex I and non-Annex I Parties. They contain information on emissions and removals of greenhouse gases (GHGs) and details of the activities a Party has undertaken to implement the Convention. They usually also contain information on national circumstances, vulnerability assessment, financial resources and transfer of technology, and education, training and public awareness; but the ones from Annex I Parties additionally contain information on policies and measures.

REDD-plus refers to efforts to reduce GHG emissions from deforestation and forest degradation, conservation and sustainable management of forest and enhancement of forest carbon stocks, in developing countries.

¹ The terms listed here are defined for the purposes of this paper, as informed by submissions of Parties and international organization, but they have not been agreed to by the UNFCCC.

Registries have not yet been defined by Parties. Some suggest that this is merely a place to list NAMAs. Others propose that the registry should also serve as a means to channel requests for support (financial, technical or other) from non-Annex I Parties to Annex I Parties.

Reportable is assumed to mean that data on the emissions reduction achieved by NAMAs is made publically available by the national governments. Current proposals include presenting the reports in national GHG inventories, national communications or a registry system, following internationally agreed guidance.

Technology Needs Assessments (TNA) are reports that identify technology needs by sector, barriers to technology transfer and measures to address them through a process of consultation with stakeholders.

Verifiable is assumed to mean an ex-post assessment the effective implementation and/or emissions reduction achieved by GHG inventories or NAMAs. The verification requirements for NAMAs could be divided depending on their nature as follows:

- For NAMAs undertaken by the developing country without international financial support, the verification could be by a national entity working with international guidelines.
- For NAMAs undertaken with international financial support, verification could be through an entity accredited by UNFCCC.

1 INTRODUCTION

The paper reviews the experience of developing countries with respect to preparing GHG inventories, identifies issues relating to nationally appropriate mitigation actions (NAMAs) as proposed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC), and identifies the likely support developing countries will need if there is agreement to undertake NAMAs at COP 15 in Copenhagen.

Background

The Bali Action Plan² identifies NAMAs as a means for developing countries to enhance greenhouse gas (GHG) emission reductions required to achieve the main objective of the Convention. More specifically, paragraph (b) (ii) of the Bali Action Plan call for “enhanced national/international action on mitigation of climate change, including, inter alia, consideration of: ...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 measureable, reportable and verifiable manner.” (For a more detailed description of the context of the Bali Action Plan in relationship to mitigation, please refer to the UNDP 2008 document, *“Climate Change Mitigation Negotiations, with an Emphasis on Options for Developing Countries”*, prepared by Harald Winkler.)

The Bali Action Plan does not precisely define NAMAs, but it is foreseen that they will be voluntary, country driven, compatible with the sustainable development needs of each country, and encompass actions aimed at reducing emissions by sources and/or enhancing captures by sinks. Submissions from Parties to the UNFCCC suggest that NAMAs should integrate two goals: 1) changing a country’s economic development path

to be more sustainable and 2) contributing to GHG mitigation. Parties and observers have suggested various approaches to measure, report and verify NAMAs, including the creation of a registry to facilitate measureable, reportable and verifiable (MRV) actions and support, the development of national low-carbon growth plans (LCGPs) to identify, elaborate and integrate NAMAs, and the enhancement of existing structures, namely national communications and inventories. **These three elements (LCGPs, NAMAs and MRV), taken together, will have implications for how obligations are defined, how they are financed and implemented, and how Parties evaluate each other’s delivery on those obligations.** Significantly, the three elements will also define the capacity building needs of developing countries. In particular, the term “measurable, reportable, and verifiable” was critical to the agreement of the Bali Action Plan. The way in which the concept of MRV is reflected in the post-2012 agreement will have significant implications for the effectiveness of that agreement and so for capacity building needs.

In the context of international environmental agreements, verification systems typically serve two sets of objectives: one related to accountability and trust building, and another related to facilitating implementation.³ Discussions on what will constitute measureable, reportable and verifiable (MRV) requirements for NAMAs and the respective finance and technology support to them are still underway and a clear agreement is likely only to be obtained in or after the fifteenth Conference of the Parties (COP 15). However, it is reasonable to assume that the UNFCCC is likely to draw on its experience with national GHG inventories, which estimate a country’s anthropogenic emissions and removals of GHGs in a given year, the Clean Development Mechanism (CDM)⁴

² On December of 2007, the Parties of the UNFCCC agreed on a process to implement the Convention through long-term cooperative action up to and beyond 2012. The process, named the “Bali Action Plan”, aimed at reaching an agreed outcome at the fifteenth Conference of the Parties in Copenhagen in December 2009.

³ MacFaul (2006)

⁴ The CDM has facilitated cooperative activities between Annex 1 and non-Annex 1 Parties, stimulated private and public sector involvement in mitigation, allowed the identification of cost effective mitigation options, and supported the establishment of the carbon market. In some cases, the CDM has even served as a technology transfer mechanism, including both technology equipment and knowledge. One lesson learned from the CDM relates to the international accreditation and registration procedures for credits under the CDM. The process provides a substantial degree of rigour in the measurement and verification of emissions at the project-level. Additionality must be assessed case by case and performance monitored and verified using project-specific baselines and methodologies. While the process is resource intensive, the elements are similar to those that may be part of a NAMA system.

and national communications.⁵ A more comprehensive assessment of existing reporting and review procedures for both GHG inventories and the national communications for developing countries under the Convention is found in Section 3 of this document.

In addition, it is generally agreed that low-carbon technologies will be an essential part of meeting the climate change challenge. Some developing countries have begun to assess their technological needs (options) with a view to setting priorities for achieving sustainable development and avoiding dangerous anthropogenic climate change. A technology needs assessment (TNA) process can achieve a number of desirable ends, namely contributing to enhanced capacity to understand and ultimately acquire environmentally sustainable technologies, developing important links among stakeholders to support future investment and barrier removal, contribute to the preparation of NAMAs and LCGPs. Whether TNAs will play a formal role in a post Copenhagen agreement is, again, yet to be decided.

⁵ The UNFCCC (Articles 4.1 and 12) requires all Parties to report on their activities to implement the convention through national inventories and national communications. National inventories report quantitative information on countries' anthropogenic emissions and removals of greenhouse gases, whereas national communications report on a wider range of activities related to climate change, including policies and measures, vulnerability and adaptation, and research. Under the principle of common but differentiated responsibilities, Annex I and non-Annex I countries have different obligations under the Convention and under the Kyoto Protocol. As such, they are also subject to different reporting requirements.

2. OVERVIEW OF POTENTIAL CAPACITY BUILDING NEEDS OF DEVELOPING COUNTRIES WITH REGARD TO EXISTING OPTIONS FOR NAMAS

Parties and organizations have proposed different forms of NAMAs (projects, plans, programmes, strategies and policies) and different levels of implementation (local, sub-national or national) to be undertaken by a developing country. The proposals from Parties have been compiled in several UNFCCC documents⁶ and further synthesized by the Chairman of the Ad-hoc Working Group on Long-term Cooperative Action (AWG-LCA) in other documents.^{7,8} Table 1 summarises the various proposals for NAMAs.

It is likely that the current negotiations will not explicitly preclude any of these, but will identify the elements to be included in a NAMA, specific requirements for recognition (registration), financial/technological support or generation of credits, stipulate whether they are binding or voluntary, and determine for whom would they apply.

This section presents an overview of the options for NAMAs by developing countries as proposed by Parties and international organizations. Information is also presented on the requirements for their implementation, including monitoring, reporting and verification and the associated capacity building needs. To facilitate the analysis, the information is presented in different categories reflecting the scope of the mitigation actions. A summary of capacity needs of developing countries is presented in Annex 1.

Table 1: Proposals for NAMAs⁹

1. National Mitigation Strategies or Plans	Low Carbon Development Strategies
	Nationally appropriate mitigation plans
	Low carbon strategies
	Strategic programme approach
2. Individual Policies and Measures	Sustainable Development Policies and Measures
	Carbon taxation and regulation
	Cap-and-Trade
3. Sectoral Measures	Sectoral targets
	'No lose' sectoral crediting
	Programmatic CDM
4. Deforestation	REDD+

⁶ FCCC/AWGLCA/2008/MISC.2, FCCC/AWGLCA/2008/MISC.3, FCCC/AWGLCA/2008/MISC.5, FCCC/AWGLCA/2008/MISC.6, FCCC/AWGLCA/2009/MISC 1, FCCC/AWGLCA/2009/MISC 4, FCCC/AWGLCA/2009/MISC 5 with their addendums and corrigendum.

⁷ FCCC/AWGLCA/16/rev1

⁸ FCCC/AWGLCA/2009/4

⁹ FCCC/AWGLCA/2009/INF.1

2.1 National Mitigation Strategies or Plans

National mitigation strategies or plans are proposed as a structure for integrating NAMAs and as a means of orienting them toward a broad mitigation goal¹⁰. This category includes the following related proposals:

- **Low Carbon Development Strategies (LCDS)**¹¹: The European Community and its member States defines LCDS as “*the structure for developing countries to indicate their contribution to the global mitigation effort and to describe the nationally appropriate mitigation actions (NAMAs) they intend to undertake in order to realise this contribution, as well as to indicate what support would be necessary to enable these NAMAs*” (UNFCCC/2009/MISC4P01). It proposes that the LCDS include an emission pathway for a low carbon development of the developing country as well as the identification of both NAMAs that can be implemented autonomously and the NAMAs that requires assistance for its implementation. It also proposes that strategies should be in place no later than 2012
- **Nationally Appropriate Actions Plans**: Norway (UNFCCC/2009/MISC4P02) and Japan (UNFCCC/2009/MISC4P01) refer in their submission to National Action Plans. Norway proposes them as a first step towards a low emissions development strategy, and specifies that countries should develop the plans “*for national appropriate mitigation actions for all sectors*”. Japan indicates that the mitigation plans should set bidding targets for total GHG emissions or energy consumption per GDP as well as targets for major sectors. Norway also proposes that the plans should include the establishment and development of the institutional framework for systematic national inventories for emissions and removals and a process for periodically reviewing them. Similarly to LCDS, countries would identify in their plans, the needed support for implementing NAMAs.

- **Low-carbon strategies**: The United States proposed (UNFCCC/2009/MISC4P02) that developing countries whose national circumstances “reflects greater responsibility or capability” should formulate and submit low carbon strategies for long-term net emissions reductions by 2050. The level of reduction is set by each of such countries “*consistent with levels of ambition needed to contribute to meeting the objective of the Convention*”. The Low Carbon Strategy is also proposed for developed countries but for them, the US proposed a minimum threshold of net emissions reduction by 2050.
- A number of Latin American Parties (Colombia, Costa Rica, Mexico) have proposed a ‘**strategic programme approach**’ wherein countries would aggregate national policies and measures for low carbon development together with CDM and internationally supported NAMAs. This ‘strategic approach’ would deliver a set of domestic reduction, provided there were further Annex 1 emission reductions.

Strategies or plans are generally intended to cover all or at least the most important sectors (i.e. power generation, industry, commercial/residential and transport). These plans could identify near term policies and measures, anticipate or commit with specific outcomes, estimate costs associated with reduction strategies, and identify needs for financial and technology support (see Section 4 for a more comprehensive listing of what a strategy or plan might include).

Some Parties (European Union, Japan, United States) propose that these strategies or plans should quantify the target or goal as well as the emissions reductions effort resulting from the implementation of NAMAs as the deviation of a business as usual scenario or a baseline, or as energy consumption per GDP. Furthermore, the European

¹⁰ Mexico, Brazil and South Africa have published national plans where they identify activities they can undertake on their own, side by side with those which can be implemented with international support, coordinated through inter-ministerial bodies. The ‘consultation version’ of the second national communication of Peru also identifies the support needed to set up of registries and address activities relating to NAMAs, including those linked to CDM.

¹¹ The declaration of the leaders of the Major Economies Forum on Energy and Climate: (Australia, Brazil, Canada, China, the European Union, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, Russia, South Africa, the United Kingdom, and the United States) in L’Aquila, Italy, on July 9, 2009 indicates that these countries will prepare Low Carbon Development Plans (LCDPs).

Union suggests that when presented in strategies and plans, NAMAs should be classified as:¹²

- Unilaterally implemented: Autonomous NAMAs that will be financed and implemented by the country itself;
- NAMAs requiring support, or
- Actions supported by the emission crediting or offset mechanisms through the carbon market.

It is anticipated that the full cost of preparing national strategies or plans by non-Annex I Parties would be provided for by Annex I Parties.

Questions for Consideration For negotiators

- *Is the elaboration and submission of the national strategy or plan a condition for developing countries to propose and implement NAMAs, or can they undertake NAMAs without formulating the strategies or plans?*
- *What will be the treatment of NAMAs identified after the submission of the strategy or plan and therefore not included in it?*
- *What will be the relation between the national strategies or plans and the National Communications and National GHG Inventories?*
- *Does the strategy or plan be measured, reported and verified a part from each individual NAMA included in it?*
- *Will the UNFCCC develop a methodology or standardize format for formulating the national strategy or plan?*

For policy makers formulating national strategies or plans

- *Institutional:* Is there sufficient coordination between government agencies at a national and local level to agree on the strategy or plan?
- *Technical:* For major emitting sectors, is there sufficient capacity to identify and evaluate potential NAMAs, develop baselines and national emissions projections using different models, and identify and assess mitigation technologies and options?
- *Economic:* How well can the cost-effectiveness of NAMAs be evaluated using existing macro-economic models, as well as for the requests of funding for implementation? What approach will be used if macro-economic models are not available?

2.1.2 MRV of Strategies and Plans

Two types of reports may be needed: an initial report outlining the strategy or plan and a progress report describing implementation activities. For the latter, the national communications could be used as a model from which to build, as ‘reviews’ will most likely be needed of the initial strategy or plan and the progress report.

Any review of the initial report and progress report (if not tied to a review of a national communication) will be related to whether/how the UNFCCC chooses to review GHG emission inventories. It is possible that a GHG emission inventory could be reviewed as part of an initial plan or through a separate expert review process as currently done for Annex I countries (see Section 4 for a further discussion of GHG inventory capacity building needs based on the experiences identified in Section 3). Other elements of an initial strategy or plan could undergo a separate review or be part of a process of reviewing the GHG inventory. These are important issues that will need to be decided through the negotiations. The capacity and any special assistance to respond to an international review could be quite minimal, but will depend on the nature of the review process.

2.2 Policies and Measures

South Africa and the European Union have elaborated on a framework for NAMAs under a national strategy or plan. South Africa proposed a three step registry system as a means of ‘developing, reviewing and reporting’ as follows:

1. Developing countries initially register an indicative list of NAMAs, support needed and related information (assumptions, methodology, emissions reductions, baseline etc.)
2. After the assessment of the above information by a technical panel, financial and technology mechanisms would be responsible for matching Annex I countries support to actions.
3. Implementation of actions, both the action and support, will be measured, reported and verified. Following the first MRV report, the NAMA would be considered registered.

¹² Based on this EU proposal, current negotiating text has captured this NAMA classification with no association or condition to the existence of a strategy or plan.

The proposal of South Africa also includes a “national coordination body” as a “focal” point for that would facilitate the co-ordination and registration of nationally appropriate mitigation actions (NAMAs) included in the plan and to be submitted to the international register.¹³ South Africa expects that, in the long term, developing countries could assume the costs of national coordinating bodies whose function it is to prepare reports, but in the short term, the administrative costs of coordinating bodies established for this purpose would need to be covered through international financial resources made available specifically for this purpose.

Although several Parties refer to policies and measures in their submissions on NAMAs, most Parties provide few details on the information needed to elaborate a NAMA. This document assumes that, in its simplest form, a NAMA would need to include an estimate of the current GHG emissions (base line), a description of the NAMA(s) to be undertaken, and a projection of GHG emissions over a future period after the NAMA is implemented. Information on how they will be implemented and measured would also be needed, at least in a gross way. This section provides a few examples of individual policies and measures, some of the information that would be needed and the support identified by Parties.

The Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment Report (IPCC, 2007) identifies policies, projects and programmes that could constitute a NAMA. A few examples of policies and measures are as follows¹⁴:

- *Economic incentives*: Phasing out subsidies, tax credits or feed-in tariffs for renewable power
- *Target economic/fiscal measures*: Landfill, CO₂ or fuel taxes
- *Regulation and standards*: Energy efficiency standards, bio-fuels standards and electric market regulation.
- *Market-based measures*: Green certificates and emissions trading.
- *Research and Development (R&D)* for low-carbon technologies and demonstration projects.

A few non-Annex 1 Parties (China and Korea) are informally exploring *carbon taxes* and *Cap-and-Trade schemes* as measures to reduce GHG emissions. Both measures can be implemented at a national level to achieve a specific emission reduction target in a cost-effective manner.

Typically, a **carbon tax** on GHG emissions requires individual emitters to pay a fee, charge or tax for every tonne of GHG released into the atmosphere. An emitter must pay this per-unit tax or fee regardless of how much emission reduction is being undertaken. Each emitter weighs the cost of emissions control against the cost of emitting and paying the tax; the end result is that polluters undertake to implement those emission reductions that are cheaper than paying the tax, but they do not implement those that are more expensive. An emissions tax provides some assurance in terms of the marginal cost of pollution control, but it does not ensure a particular level of emissions. An example of this type of tax is the Swedish tax on NO_x emissions of the major energy producer point sources.¹⁵

A **Cap-and-Trade** measure sets a cap on emissions and distributes a limited amount of emissions “allowances” or “permits” to sources; equivalent to the overall emission target. It allows trading of permits or allowances among sources. For compliance, sources have to report emissions equal to the amount of permits or allowances or pay a penalty. Examples of these measures are the EU Emissions Trading System (EU-ETS) created for compliance with the Kyoto Protocol (KP) EU targets and the US Acid Rain program for reduction of SO₂ emissions in the power sector.

Parties and organizations proposing the above national mitigation measures envisage integration with the current carbon market created by the flexibility mechanisms of the KP. This integration could be done making allowances or permits fungible with the Kyoto carbon units (assigned amount units - AAUs, emission reduction units - ERUs, certified emission reductions - CERs and removal units -

¹³ Additional functions for the national coordination body would include: Coordinate climate change funding, technology transfer, and activities identified in the plan, including identifying and prioritizing needs and guiding the preparation of proposals.

¹⁴ When implemented simultaneously single policies could form the basis for a sectoral approach.

¹⁵ More information on the Swedish tax program on: www.naturvardsverket.se

RMUs) or auctioning or giving a portion of Annex I allowances to countries implementing these measures.

Two types of financing may be necessary: financing to design the policy or measure, and financing to implement it. The first type of financing might come from bilateral or multilateral sources and would be directed to the national institutions responsible for the policy or measure. The second type could come from public sources or the carbon market and may need to be directed at the national institution responsible for the policy as well as the affected entity (source or facility).

Questions for Consideration For negotiators

- *How would policies and measures (e.g. tax incentives or phasing subsidies) that stipulate the amount of emissions reduction to be achieved, but do create conditions or incentives for emissions reductions, be MRVed?*
- *How would leakages¹⁶ be considered when estimating or measuring the mitigation result of a policy or measure?*
- *How would national policies or measures that are implemented simultaneously within a sector be MRVed?*

For policy makers formulating a single national policy and measure

- *Institutional strengthening:* Does capacity in national institutions to implement Cap-and-Trade or carbon tax schemes?
- *Legal:* Is there an existing national legal instrument for adopting the rules and procedures of such schemes, or would one need to be created?
- *Technical:* Does technical capacity exist to create formats and procedures for emissions measuring, reporting and verification on each source included in the scheme? Does technical capacity exist to analyze the emissions reduction alternatives, costs and calculation of a target or tax level? In the case of Cap-and-Trade measures, would additional support be needed to design and implement a registry system for the tracking the trading of domestic allowances or permits? In the case of a carbon tax, would additional

support be needed for collecting the tax from regulated sources?

2.2.2 MRV of a single national policy and measure

The measurement and reporting of economic and fiscal policies and measures is difficult as they do not reduce emissions directly but induce entities or individuals to change their behavior. Therefore, it is not easy to identify what will be measured and reported for such a NAMA, other than the emission inventory data at the national or sectoral level. Instead of focusing on emissions, MRV requirements for policies and measures could also include indicators, such as, fuel price levels, tax levels, and enforcement activities.

On the other hand, capacity needs for measurement, reporting and verification of Cap-and-Trade or carbon tax systems, could comprise the following topics:

Measurability: Support for estimating and tracking GHG emissions at the facility/source level using methodologies compatible with UNFCCC or IPCC guidelines.

Reportability: Support to integrate and analyze information on allowances relating to Cap-and-Trade measures or on a carbon tax with national inventories. Similarly, if domestic allowances or permits are fungible with Kyoto units, support would be required to ensure compatibility of a domestic registry with the UNFCCC international transaction log.

Verifiability: Both Cap-and-Trade and carbon tax measures need national verification of the periodic reporting of emissions by regulated sources. International verifiability could be placed on checking the proper functioning of both the GHG estimation by sources and the verification at a national level. Therefore, no support would be needed different from the technical support for the implementation of these procedures.

¹⁶ In the context of CDM projects, leakage is defined as the net change of anthropogenic emissions by sources of greenhouse gases (GHG) which occurs outside the project boundary, and which is measurable and attributable to the CDM Project activity.

2.3 Sectoral Mitigation Measures

Parties have proposed several different sectoral measures as a means to limit GHG emissions. These proposals include:

- Sectoral approach (Japan)
- Sectoral crediting and trading (EU)
- Programmatic CDM (various Parties)

Generally, submissions from Parties either note or assume that sectoral measures would require an estimate of current GHG emissions in a specific sector (i.e. energy generation, transport, industries etc.), a projection of GHG emissions under both a business-as-usual and policy case, and an analysis of potential of emissions reduction options to achieve in a target in a specific timeframe. While not specified by Parties, examples of mitigation actions within a sector that could be implemented simultaneously include:

- Energy efficiency programmes;
- Regulations and standards;
- Preferential taxes;
- Standards for lightning, heating, hot water supply and other household appliances;
- Subsidies and low interest loans;
- Voluntary emissions/energy reduction programmes with reporting and auditing;
- Fuel change or blending programmes in transport sector;
- Mass Transport Systems; and
- Technological benchmarking.

Japan proposes that a sectoral approach should be used for all emitting sectors and that the sectors should be aggregated to form a national target on a bottom up basis. It notes that a sectoral approach could identify the best practices and technologies in each sector and promote the transfer of such technologies and experiences.

The EU and Indonesia propose establishing the target as a threshold or “no-lose target” defined below the business-as-usual trend, taking into account the specifics of the sector and the potential for efficiency and innovation. Mitigation actions could be undertaken autonomously or require some international support. For all the emission reductions achieved beyond a certain threshold, the developing country would receive emission credits that it

could sell. No penalty would accrue if the threshold is not reached. Programmatic CDM has a similar structure, but without the “no-lose target”. That is, countries will receive emissions credits for the difference between the business-as-usual or baseline, and the actual emissions.

The EU also proposes an alternative sectoral approach named “sectoral trading”. Similarly to a Cap-and-Trade programme, sectoral trading would require setting an emission threshold for a sector below business-as-usual trend. The developing country would be able to sell credits to finance the emissions reduced below the target. If that is not the case, the Party would need to buy back units to ensure that the target is met, in order to maintain the integrity of the system.

Similar to single national policies and measures, financing needs can be divided into two: covering the design phase (assessment of the potential for reduction, activities/technology identification and target definition) and the activity implementation phase. For the first phase, financing would be needed to cover the full agreed costs depending on the complexity of the country and sector, and could come from multilateral or bilateral funds. For the implementation phase, financing could cover incremental costs through carbon financial mechanisms via the carbon market.

Questions for Consideration For negotiators

- *Would the emissions in a sector and any associated reductions be part of a national GHG inventory or should they be treated separately in the way that programmatic CDM is currently working?*
- *Would leakages be considered when estimating or measuring the mitigation result of a sectoral measure?*
- *What would be the relation between sectoral measures and CDM projects or programmes?*
- *Who would own the carbon credits associated with sectoral measures?*

For policy makers formulating sectoral mitigation measures

- *Institutional:* Does capacity exist in national institutions for implementing or enforcing mitigation activities? If crediting is included in the sectoral approach, do national institutions exist that could

establish national registries for the holding, transfers and acquisition of allowances or credit, or would such an entity need to be created? Would additional capacity support be required for developing the national registry? If emissions trading is included in the sectoral approach, would assistance be required for establishing a national/sectoral cap-and-trade system?

- *Technical:* Does specialized capacity exist in each major emitting sector for identifying and evaluating potentials for emissions reduction and associated mitigation activities or technologies? Does technical capacity exist for evaluating cost-effectiveness of sectoral mitigation activities/technologies as well as for the requests of funding for implementation?

project boundaries, baselines and the use of emissions factors. Table 2 provides examples of the possible data requirements to design and measure sectoral NAMAs.¹⁷

2.3.2 MRV of Sectoral Mitigation Measures

MRV requirements for sectoral mitigation measures would depend mainly on type of approach agreed for assessing the emissions reduction benefit of the sectoral NAMA. The range of assessment approaches comprise, among others:

- *Absolute emissions limits or percentage reduction for the corresponding sector* compared with a business-as-usual trend or its emissions in an historic reference year.
- *GHG emissions intensity targets on the output data of the corresponding sector.* For example in the cement sector, a NAMA could target a given level of CO₂ emissions per tonne of cement produced.
- *Amount or percentage of units/industries in a sector using a specific technology or adhering to a particular standard.* For example, the number of energy generation facilities with combine cycle technology; or percentage of vehicles using motors with EURO III emissions standards.

Although the above approaches are not mutually exclusive, if flexibility is allowed in a Copenhagen agreement, it would be necessary to establish measurement and reporting forms, standards and guidelines for assuring accounting consistency and comparability of NAMAs within the country as well as with other countries. Depending on the type of assessments of NAMAs, reporting could include a description of methodologies,

¹⁷ Examples of NAMAs are based on China (WRI 2009) and Mexico (Programa Especial de Cambio Climático, 2009).

Table 2. Examples of Indicators for NAMAs

Sectoral NAMAs	Absolute emissions limits	Intensity targets	Technology penetration target
Industrial sector			
Retrofit coal fired industrial boilers	Energy efficiency of boilers. Annual fuel consumption of boilers. Annual output of industries with retrofitted boilers.	Average energy consumption of new boilers. Average industrial output with retrofitted boilers.	Number of industries with retrofitted boilers. Capacity or type of new boilers.
Residual heat and pressure utilization in steel and aluminum industries.	Energy efficiency of industries. Annual fuel and/or electrical consumption in industries. Annual output of industries in the programme.	Average energy efficiency in industries before and after the programme.	Number of industries with utilization of heat and pressure. Energy savings reported by industries.
Buildings and Residential sector			
Retrofit of electrical appliances in residential sector (refrigerators, lightning etc.)	Annual electricity consumption in buildings. Emissions factor for the grid or supply source.	Average annual electricity consumption in buildings.	Number of appliances or buildings in the programme.
Energy saving design standards in new buildings	Annual electricity and/or fuel consumption in buildings. Emissions factor for the grid or supply source.	Average annual electricity consumption in buildings (with and without standards)	Number of buildings with new design standards implemented.
Transport sector			
New vehicle efficiency standards	Number of vehicles per type. Annual passengers or tons products transported, and distance of transportation per vehicle type. Fuel efficiency per vehicle type. Or Fuel consumption of vehicles per type.	Number of vehicles per type. Fuel efficiency per vehicle type.	Number of vehicles with new efficiency standards. Total vehicles in sector/subsector.
Mass transport systems (MTS) development	Annual number of passengers transported by MTS. Distance traveled by MTS. Average fuel efficiency of MTS. or Annual fuel or energy consumption of MTS.	Average fuel/energy efficiency of MTS compared with other transport modes. Average number of passengers transported by MTS and other modes.	Number and capacity of MTS developed.
Energy generation sector			
New investments in renewable energy generation sources.	Annual energy generated by type of source. Annual fuel consumption per type of source.	Capacity installed of each type of energy source. Country emission factor for each type of energy source.	Capacity of renewable energy generation sources. Total energy installed capacity.
Closure of small thermal generation enterprises and replacing with new generation projects.	Fuel consumption and generation of both closed thermal generation units and new projects.	Average fuel efficiency of closed generation units and new projects.	Number, type and capacity of closed thermal generation units and new projects.

2.4 Deforestation (REDD-plus)

In the context of UNFCCC negotiations, REDD-plus refers to efforts to reduce GHG emissions from deforestation and forest degradation, and to conserve and sustainably manage forest and enhance forest carbon stocks, in developing countries. Parties have made a variety of proposals concerning the eligibility and treatment of forest degradation, conservation and sustainable management which are currently part of an intensive debate within the UNFCCC negotiations. However, as the Bali Action Plan includes this issue, Parties have made a variety of proposals. For example, submissions from Indonesia, Central American countries, and Norway suggest that REDD-plus actions should be considered as a sectoral NAMA, while others (Colombia, India, New Zealand, and the Rain Forest Alliance - 23 Developing Countries,) envisage the creation of a special REDD-plus mechanism with different scope, requirements and financial sources. This report makes no judgement about the form of a mechanism for REDD-plus.

To advance understanding on this issue, a number of Annex 1 countries are supporting a World Bank initiative called the Forest Carbon Partnership Facility (FCPF). The FCPF aims to build capacity in developing countries through a multi-phased approach as follows:

- a. *Readiness phase:* In this phase Parties are asked to establish a national forest monitoring and accounting system, develop a reference case for forest emission levels, and identify policies and measures for enhancing national frameworks for forest management. One of the outcomes of the readiness phase would be the formulation of a REDD-plus national strategy or plan.
- b. *Policy implementation and demonstration phase:* In this phase, Parties would start to implement of policies and measures for the reduction of deforestation and degradation. It could also include the implementation of pilot projects or reductions in a sub-national approach.

- c. *Full implementation phase:* In this phase, the policies and measures would be fully implemented and deviations from the reference forest emissions level would be monitored.

Few Parties have elaborated on policies and measures in their submissions to the UNFCCC that will reduce forest degradation or deforestation, although several countries have submitted information to the World Bank as part of the FCPF or under the UN-REDD Joint Programme that identified needed actions.¹⁸ These actions could include institutional reforms, adjustments to forest laws and governance, forest conservation payments, reforms of land tenure and enhancement of enforcement capabilities, among others.

Financial support would vary, depending on the phase: for readiness actions, financing would be needed to design national monitoring system, identify policies, to hold consultations and to elaborate a REDD plus national strategy; for the implementation phases, Parties will need support to build a MRV system and for any financial incentives associated with implementing the policies and national strategy. If REDD plus actions include sub-national or project based approaches, financing would probably need to facilitate access to the carbon market.

Questions for Consideration For negotiators

- *Do national forest emission estimates associated with REDD plus activities replaces or supplement the land use, land use change and forestry section in national GHG inventories?*
- *If REDD plus is considered as a sectoral NAMA, would it also include a “non-lose target”? That is, would countries be required to reduce to a minimum level of deforestation/ degradation before generating carbon credits?*
- *Should forestry plantations be included in the accounting of REDD plus activities?*
- *How would issues relating to permanence, co-benefits, consultations with local communities and land tenure be addressed in a REDD plus mechanism?*

¹⁸ Readiness Plans have been developed by Panama, Indonesia and Guyana as part of the FCPF, and Vietnam, Indonesia, Tanzania, Papua New Guinea, and the Democratic Republic of the Congo have made submissions under the UN-REDD Joint Programme.

For policy makers formulating REDD-plus actions

Legal/Institutional: How feasible will legal and institutional reforms, such as law and policy development, and land tenure administration and enforcement, be?

Technical: Does technical capacity exist to identify deforestation drivers and agents, estimate future rates of deforestation, and develop revenue sharing and distribution models? Does technical capacity exist for the monitoring and for preparation of periodic national forest inventories, as required for MRV actions (below)?

2.4.2 MRV of REDD-plus actions

Countries would need to create a monitoring system for periodic national forest inventories that could comply with UNFCCC or IPCC guidelines, international reporting requirements and verification by independent experts. This could require the acquisition of satellite images or other remote sense data, as well as their processing, interpretation and classification. For estimating carbon benefits of REDD plus actions, carbon densities for each type of forest would need to be estimated using permanent carbon plots.

Given the uniqueness of this sector, reporting on an annual basis may not be necessary. At a national level, it can be anticipated that MRV requirements for REDD plus actions may be similar to those for national inventories. Depending on the type of baselines and incentives schemes agreed to by Parties, countries might also need to estimate future deforestation, analyse historic levels and map deforestation hot spots.

If sub-national or project based approaches are included as REDD plus actions, the integration of local forest measurements with the national monitoring system would be required, as well as the detection of leakages attributable to the project or the sub-national action. A sub-national or project approach would imply a similar verification system as the one implemented in the CDM, that comprises an independent entity who verifies the results of REDD plus actions at a project or sub-national level.

3. EXPERIENCES OF DEVELOPING COUNTRIES IN PREPARING GHG INVENTORIES AND NATIONAL COMMUNICATIONS UNDER THE UNFCCC

All Parties to the Convention are required to communicate to the COP information relating to national GHG inventories and a description of steps taken or envisioned to implement the Convention. Non-annex 1 Parties usually do this in conjunction with their National Communication. To assist non-Annex 1 Parties, the COP adopted guidelines for their preparation, with the most recent guidelines adopted in 2002 (decision 17/CP.8). The major headings to be addressed include: national circumstances, national GHG inventory, general description of steps taken or envisaged to implement the convention; other relevant information relevant to the UNFCCC objective; and constraints and gaps in implementing the UNFCCC. These guidelines provide a foundation for a MRV system for developing countries.

The activities undertaken to support non-Annex I Parties in the preparation of National Communications and GHG inventories were the most significant capacity building effort ever undertaken through the Convention. While much has been learned from other capacity building efforts,¹⁹ the lessons learned from this process are the most relevant, as the UNFCCC anticipates the need to prepare Low Carbon Growth Plans and NAMAs and subjecting them to an MRV process. As noted above, experiences in providing support to develop inventories will be relevant to both LCGPs and NAMAs. However, LCGPs and NAMAs are also likely to require the preparation of emission projections and analysis of policy options which here to fore have not been undertaken by many developing countries. Also, both LCGPs and NAMA are likely to undergo some form of review, a process that has not been required for GHG inventories or National Communications until now.²⁰ These new elements need to be borne in mind while considering the information in the following sections.

Annex 2 contains a detailed assessment of country experiences and needs in preparing GHG inventories, based on submissions to the UNFCCC.

Some, but not all, of these issues will need to be addressed in the context of the Bali Action Plan. It should be anticipated that comprehensive national GHG inventories will need to be prepared more completely and frequently than in the past for at least those countries with high emissions that commit to LCGPs and that institutions in some countries will need to be supported continuously for at least a decade. Many Parties will need support to gather additional activity data and improve their emission factors. However, some criteria will be needed to determine what support is most appropriate given the emissions of a source relative to others in a country and the relevance to the global totals.

3.2 Experiences in identifying Mitigating Measures in National Communications

National Communications largely tell (report) a story about what a country has done. They document the past by compiling information from different government sources. They rarely outline a strategy, actions and tasks that a country will undertake in the future. LCGPs and NAMAs are intended to be quite different. Their purpose will be to serve as a means to identify the programmes, projects and policies a country will undertake in the future to mitigate emissions given financial and technical support and, therefore, their contents will be markedly different and the institutional arrangements for their preparation will need to be different.

However, the experience in compiling mitigation options in National Communications can serve as a starting point for the preparation of LCGPs and NAMAs. Many countries have at least given some consideration to the measures that could be implemented given sufficient support. For example, some Parties (e.g. Botswana, Ethiopia, Nicaragua, Saint Lucia, Sudan, Tunisia) reported on methods used to project the level of future emissions using business-as-usual and one or two abatement or sequestration scenarios.

¹⁹ Other capacity building efforts have been directed at assessments of the impacts of climate change, participation in the CDM, and the preparation of TNAs and NAPAs by Least Developed countries.

²⁰ The COP established a Consultative Group of Experts on non-Annex 1 National Communications (CGE), to examine national communications and to provide technical advice, through the organization of training workshops, on national GHG inventories, vulnerability and adaptation, and mitigation. The CGE does not review individual National Communications or GHG inventories and provides no information on issues relating to their content to Parties. It has done six synthesis reports of non Annex 1 National Communications.

Similarly, 85 Parties identified measures in the energy sector to abate GHG emissions. Roughly half of the reporting Parties also identified measures to limit emissions and enhance removals by sinks in the LUCF sector, while two-thirds outlined transportation measures. In the context of the Bali Action Plan's focus on technology development and transfer between developed and developing countries, it is important to note that national communications have been used to outline technology needs (Box 2).

Box 2 Technology Needs Assessments

Technology Needs Assessments involve stakeholders in a consultative process to identify technology needs by sector, barriers to technology transfer and measures to address these barriers. As of June 2008, the Global Environment Facility (GEF) had provided funding to 92 non-Annex I Parties to conduct TNAs through its interim financing for capacity-building in priority areas – enabling activities phase II (also known as 'top-ups'). Out of these, 78 are being supported by the United Nations Development Programme (UNDP) and 14 by the United Nations Environment Programme (UNEP). To help Parties conduct TNAs, UNDP developed a user-friendly TNA Handbook, which provides guidance on identifying technology needs for the mitigation of and adaptation to climate change.

The TNA reports are a tool for national decision makers and other actors involved in the technology transfer process. The TNAs not only help to identify specific technology needs, but also point out the direction in which future policies and regulations will need to progress. They also provide useful information for the implementation of future activities aimed at mitigating climate change.

In this context, they serve as a means to 'jump start' the consideration and development of NAMAs in developing countries. Submissions by Parties suggest that TNAs should be expanded to cover more in-depth assessments of obstacles in the functioning of relevant technology innovation systems, including detailed assessment of technology capacity and markets.

3.3 Constraints and Support Needed for Analysis of Mitigation Options.

Parties indicate that many of the measures and options have not been comprehensively assessed and that further assistance will be needed to conduct detailed cost-benefit analysis of these options, and to identify the relevant entities and stakeholders that may be affected by the measures in order to create a reporting system that can support the various NAMA proposals on the table.

Examples of the assistance identified by Parties:

- Trained personnel to undertake analysis of demand-side management measures, plans and programmes.
- General education to improve public awareness and acceptance of new technologies and resource conservation opportunities.
- Capital to invest in new technologies and opportunities to mobilize both private and public sector investment in new and renewable energy technologies, such as wind, solar, biomass, geothermal, and mini-hydropower.
- Access to affordable and efficient appliances.
- Preparation of more studies on how to integrate climate change abatement into development objectives, especially in the energy sector.

A summary of the constraints and needs of non-Annex I Parties is presented in Annex 2.

4. INTEGRATING LOW CARBON GROWTH PLANS, NAMAS, GHG INVENTORIES AND NATIONAL COMMUNICATIONS IN A CONCEPTUAL FRAMEWORK

The ultimate capacity building requirements of developing countries are far from certain at this stage of the UNFCCC negotiations. However, some elements proposed by Parties, as identified previously, could find their way forward into a final agreement. We propose here a description of how some of these elements could fit together. Based on current positions, it is assumed that all developed countries and developing countries, except least developed countries, will prepare Low Carbon Growth Plans (LCGPs) for domestic reasons and to assess their mitigation options, irrespective of whether they are formally required to do so.²¹ It is also assumed that a new financial agreement will provide financing for the full cost of preparing LCGPs, national GHG inventories, NAMAs, NAPAs and national communications. We begin with a description of an LCGP.

What is a Low Carbon Growth Plan?

An LCGP is a strategic plan to assist the country in shifting its development path to a low carbon and climate resilient economy to achieve sustainable development. It would be based on the socio-economic and development priorities of the country. It would have a long-term component that includes a strategic vision and a short and medium term component that shows which specific actions will be undertaken to get on a low carbon, climate resilient pathway. An LCGP be an operational document, periodically revised and covering:

- National circumstances of the country and current development plans.
- An assessment of vulnerability to climate change and how future climate change will affect it.
- The most recent GHG inventory.
- A long-term vision for an economy with low GHG emissions and low vulnerability to climate change.²²
- A plan for specific investments in making the economy and the infrastructure less vulnerable and measures to adapt existing infrastructure to the changing climate; a scenario the country can achieve without assistance and a scenario for which it would require international support.

- A GHG mitigation plan containing a projection of GHG emissions under a business-as-usual scenario for the most important economic sectors through development oriented and direct mitigation measures; a scenario the country can achieve without assistance and a scenario for which it would require international support.²³
- All NAMAs and NAPAs²⁴ the country wishes to undertake and their relationship to projects to be undertaken via the CDM or a sectoral crediting system. (It is presumed that projects supported by carbon crediting mechanisms would not be eligible for financial support through a LCGP/NAMA process).
- The required technological, financial and capacity building support for specific NAMAs and NAPAs.

How might a process of developing GHG inventories, LCGPs, NAMAs and National communications be undertaken?

Figure 1 provides an example of the LCGP/NAMA/NAPA process for developing countries and how that process might be connected with the existing commitments and institutions under the Convention and the Kyoto Protocol. (LCGPs prepared by developed countries would under go a similar process, but no funding would be provided by the financial mechanism.) The following steps are foreseen by the authors:

- *Preparation:* Developing countries would require technical support for preparing LCGPs; preparing national emission inventories using UNFCCC guidelines and preparing the LCGP according to agreed guidelines on content.
- Since LCGP preparation will take some time, a *fast track provision* would allow developing countries to specify and submit for funding individual NAMAs and NAPAs for a limited period after entry into force of the agreement.
- *Review:* The LCGP would likely need to be reviewed by a body under the COP. This body could be composed of international experts with experience relating to technology, policies, economic and

²¹ The declaration of the leaders the major economies forum on energy and climate: (Australia, Brazil, Canada, China, the European Union, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, Russia, South Africa, the United Kingdom, and the United States) in L'Aquila, Italy, on July 9, 2009 indicates that these countries will prepare LCDPs

²² Included here because of the synergistic effects of mitigation and adaptation in some sectors.

²³ Included here because of the synergistic effects of mitigation and adaptation in some sectors.

²⁴ Included here because of the synergistic effects of mitigation and adaptation in some sectors.

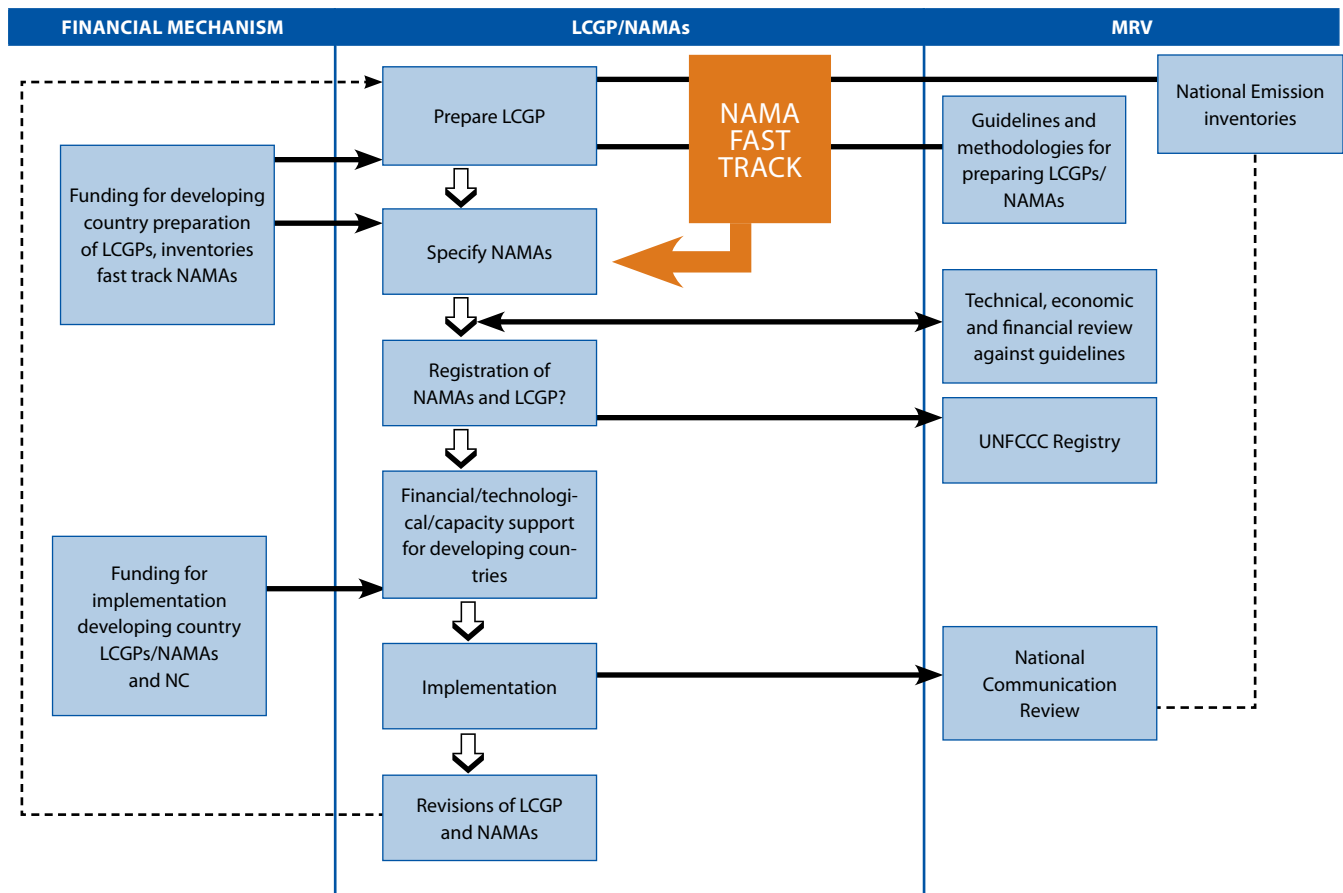
financing issues and all relevant sectors. Fast tracked NAMAs and NAPAs could undergo an accelerated review by the body. National or sectoral GHG inventories could be reviewed either through an international process or a national process according to agreed procedures.

- *Posting of information for the public:* Information on LCGP and NAMAs, including any review comments, would need to be made public. This might include posting on a UNFCCC registry.

- *Implementation and reporting:* Reporting would be done by the government and publicly available. It could be done through the existing system of national communications and national emission inventories or a separate report / system depending on the final agreement under UNFCCC.

- *Review:* Review of country implementation will be part of the regular review of the national communications and emission inventories, revised as necessary.

Figure 1. An example of a process for preparing GHG inventories, LCGPs, NAMAs, and National Communications



5. TECHNICAL SUPPORT REQUIREMENTS

What kind of technical support (relating to mitigation) would developing countries need if such a process were to be enshrined in a new agreement?

It is likely that capacity building efforts would need to begin prior to the entry into force of any agreement reached in Copenhagen by building on the experience gained over the last decade. Those countries with the highest emissions or significant interest in preparing NAMAs are likely to be the first to request support (it is assumed that not all developing countries would need to be supported from the beginning).

Countries will have different interests. Some may choose to focus initially on the preparation of NAMAs. In that case, they will need assistance to develop GHG inventory data and make emission projections for a single NAMA. Other countries may find it difficult to prepare a NAMA without first updating their entire GHG inventory so as to screen for the most environmentally effective NAMAs. Still others may wish to determine the economic implications of different NAMAs and countries with significant forest resources may wish to focus on REDD-Plus.

Support for GHG inventories will require a different level of commitment, organization and support for at least the next decade²⁵

Non-Annex I Parties have identified a number of obstacles to preparing their inventories, including lack of activity data, inappropriateness of default emission factors for national circumstances (although more countries are now developing their own emission factors); and the need for financial and technological support to ensure the continuous collection and archiving of data.²⁶ It should be anticipated that comprehensive national GHG inventories will need to be prepared more completely and frequently than in the past for at least those countries with high emissions and that some of the associated institutions will need to be supported continuously for at least a decade in many countries. However, a cost effectiveness criterion ought to be considered to guide the preparation of inventories and the expenditure of supporting resources. For example, an inventory covering 80% of GHG emissions, the top 10 sectors or key sources as defined by the IPCC, may be sufficient for many countries with

relatively low levels of GHG emissions. It makes little sense for every country to be given support to investigate every source (national emission factor and activity level).

However, the design and implementation of a NAMA (and sectoral crediting approaches) will probably need detailed inventory data on a facility, company, project, programme, sub-national or sector level in order for investors, whether multilateral or bilateral, to have confidence. This implies a need for training on different tools, e.g., corporate GHG accounting methods, than those that have traditionally made available to developing countries. It also implies that personnel in ministries, other than the environment ministry, in local governments and in business may need to be trained in using different carbon accounting tools.

Considerations of how information is to be reported and verified

A reliable GHG inventory is an essential part of a national monitoring and reporting system, as it provides detailed insights about emissions in every economic sector or subsector of the country. It helps to build the integrity of an agreement and trust among countries. Heretofore, GHG inventories from non-Annex 1 countries have not been subject to any kind of review. However, the quality and consistency of non-Annex 1 inventories would benefit greatly from some form of expert review process as has been demonstrated for Annex 1 country inventories. Reviews of Annex 1 country inventories currently also serve as an important capacity-building function for participating developing country experts. Any effort to extend a review process to non-Annex 1 countries could therefore be expected to further build capacity in those countries.

Because many of the proposed types of NAMAs are framed at a sub-national (sectoral) level, national GHG emissions may not be the most appropriate metric by which to assess the implementation of NAMAs. In that case, other indicators, for example, GHG intensity, renewable energy capacity, or area reforested, may be needed. Therefore, to measure, report, and verify NAMAs, a supplement to national inventory and national communication processes is likely to be required.²⁷

²⁵ This assumes that the UNDP is invited by the UNFCCC to be responsible for this activity

²⁶ In its National Action Plan on Climate Change (December 2008), Chile has committed to establish and operate a national system to regularly update its GHG inventory. A proposal is being prepared on this matter.

²⁷ The copper mining sector in Chile has developed, in conjunction with the World Resources Institute, a methodology to accurately estimate the GHG emissions of the sector, which is an official tool that the sector has been using since its launching a few years ago.

ANNEX 1. SUMMARY OF CAPACITY NEEDS FOR IMPLEMENTING NAMAS AS INFERRED FROM SUBMISSIONS BY PARTIES

Types of NAMAs		Capacity Needs				
NAMAs covered		Technical	Economic	Legal	Institutional	Financial
National mitigation strategies and plans	Low Carbon Development Strategies (LCDs). National Low Emission Development Strategies. National Action Plans.	Identifying and evaluating potential NAMAs, Developing baselines and national emissions projections using different models and identifying and assessing mitigation technologies and options	Evaluating cost-effectiveness of NAMAs using macro-economic models as well as for the requests of funding for implementation		Coordination between government agencies at a national and local level.	"Full agreed costs" approach, similar to national communications
National policies and measures	General economic/fiscal measures Target economic/fiscal measures Regulation and standards Market-based measures R&D Cap and Trade. Carbon Tax	Formats and procedures for emissions measuring, reporting and verification Design and implement a registry system for the tracking the trading of domestic allowances or permits. Collecting the tax from regulated sources.	Analyzing the emissions reduction alternatives, costs and calculating a target or the tax level.	To create a national legal instrument adopting the rules and procedures.	Create capacity in the national institution that will implement the cap and trade or carbon tax scheme Workshops and meetings with key stakeholders, public and private entities, and NGOs	Resources necessary to design and implement the schemes through multilateral sources Co-financing emissions reduction within the schemes with resources from Annex I countries through financial mechanisms or carbon market.
Sectoral programmes and measures	Energy efficiency Regulations and standards Preferential taxes Housing standards Performance standards for household appliances. Subsidies and low interest loans Voluntary emissions/energy reduction programmes Fuel change or blending programmes Mass Transport Systems Technological benchmarking Programmatic CDM	Specialized for each major emitting sectors, identifying and evaluating potentials for emissions reduction and associated mitigation activities or technologies.	Evaluating cost-effectiveness of sectoral mitigation activities/technologies as well as for the requests of funding for implementation	Depends on mitigation activity. Needed for regulations and standards setting.	Institutional strengthening for implementing or enforcing mitigation activities.	Financing for design phase, full cost through multilateral sources. Annex I co-financing of abatement costs: through financial mechanisms or carbon market.
REDD plus	Institutional reforms, Adjustments to forest laws and governance, Reforms of land tenure Enhancement of enforcement capabilities Forest conservation payments Project and subnational REDD	Create a sound and periodical national forest monitoring system.	For designing forest conservation payments incentives.	Legal counselling for institutional, forest law and land tenure reforms.	Institutional strengthening (personnel and equipment) for enforcement capabilities. Multi-stakeholders consultations.	Full costs financing of readiness phase. Co-finance of REDD policies and measures through market incentives or funds. Full cost finance of MRV requirements.

ANNEX 2: NEEDS AND CONSTRAINTS OF DEVELOPING COUNTRIES RELATING TO MITIGATION MEASURES

Constraints in non-Annex 1 National Communications	Capacity building/support needed	MRV Requirements in the Bali Action Plan
Many of the measures and options have not been comprehensively assessed.	Assistance will be needed to conduct detailed cost-benefit analysis of the measures and options, and to identify the relevant entities and stakeholders that may be affected by the measures.	The development of low-carbon emission pathways will be a milestone in the response of developing countries to the Bali Action Plan. Cost benefit analysis and the participation of relevant stakeholders from the beginning are two crucial issues that will need special attention in the preparation, socialization and implementation of low-carbon emission pathways.
Lack of trained personnel for GHG abatement analysis.	More trained personnel for the analysis of demand-side management measures, plans and programmes.	Preparedness for low-carbon emission pathways.
Little awareness on new technologies and resource conservation.	General education to improve public awareness and acceptance of new technologies and resource conservation opportunities. The conduct of technology needs assessments.	Capacity building is central to the post 2012 climate regime (Bali Action Plan).
No or little investment capital in new and clean technologies.	Capital to invest in new technologies and opportunities to mobilize both private and public sector investment in new and renewable energy technologies, such as wind, solar, biomass, geothermal, and mini-hydropower. Increased access to affordable and efficient appliances.	The means of implementation of NAMAs and/or low-carbon emission pathways are deemed to be an essential part of the future climate regime. Finance and technology support from developed countries will be part of the MRV of NAMAs. Different funding proposals and institutional arrangements, including a technology mechanism, are part of the current negotiating text of the BAP.
Lack of integration of climate change mitigation into development plans and strategies.	Preparation of more studies on how to integrate climate change abatement into development objectives, especially in the energy sector.	The preparation of low-carbon emission pathways or development strategies is essential to the fulfillment of the Bali Action Plan.

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