

# NAMA Guidebook

Manual for practitioners  
working with mitigation actions



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# **THE NAMA GUIDEBOOK**

## **-Manual for practitioners working with mitigation actions-**

Second Edition – 2015

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# List of acronyms

<b>ADB</b>	Asian Development Bank	<b>JICA</b>	Japan International Cooperation Agency
<b>AFD</b>	French Development Agency	<b>KfW</b>	KfW Development Bank
<b>AP-NET</b>	Asia Pacific Seminar on Climate Change	<b>LDC</b>	Least Developed Country
<b>AfDB</b>	African Development Bank	<b>LECB</b>	Low Emission Capacity Building
<b>BAU</b>	Business as Usual	<b>MDB</b>	Multilateral Development Bank
<b>BMUB</b>	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety	<b>METI</b>	Ministry of Economy, Trade and Industry
<b>BUR</b>	Biennial Update Report	<b>MOEJ</b>	Ministry of the Environment, Japan
<b>CDM</b>	Clean Development Mechanism	<b>MRV</b>	Measurement, Reporting and Verification
<b>CHP</b>	Combined Heat and Power plants	<b>NAMA</b>	Nationally Appropriate Mitigation Actions
<b>COP</b>	Conference of the Parties	<b>NAP</b>	National Adaptation Plans
<b>CTCN</b>	Climate Technology Centre and Network	<b>NC</b>	National Communication
<b>DFI</b>	Development Finance Institution	<b>NCCC</b>	National Committee on Climate Change
<b>ECN</b>	Energy research Centre of the Netherlands	<b>NDE</b>	National Designated Entity
<b>EU</b>	European Union	<b>ODA</b>	Overseas Development Assistance
<b>FSF</b>	Fast Start Finance	<b>PoA</b>	Programme of Activities
<b>GCF</b>	Green Climate Fund	<b>SBI</b>	Subsidiary Body for Implementation
<b>GEF</b>	Global Environment Facility	<b>TEC</b>	Technology Executive Committee
<b>GHG</b>	Greenhouse Gases	<b>TNA</b>	Technology Needs Assessment
<b>GIZ</b>	German Society for International Cooperation	<b>UNDP</b>	UN Development Programme
<b>ICA</b>	International Consultation and Analysis	<b>UNEP</b>	UN Environmental Programme
<b>INDC</b>	Intended Nationally Determined Contributions	<b>UNFCCC</b>	UN Framework Convention on Climate Change
<b>IPCC</b>	Intergovernmental Panel on Climate Change	<b>WB</b>	World Bank
<b>JCM</b>	Joint Crediting Mechanism		

# Preface: Introduction to the second edition of the NAMA Guidebook

Since its creation, nationally appropriate mitigation actions (NAMAs) have increasingly been studied, formulated and implemented, in expectation to realizing the potential to mitigate and reduce GHG emissions, as well as to advancing low carbon and sustainable development in developing countries. Also, initiating and scaling up mitigation actions together with adaptation actions at this stage, is critical for developing countries in the context of the preparation for a future global peak-out of GHG concentration in the atmosphere, combined with developed countries' further and leading efforts, with a view to facilitate the consideration of intended nationally determined contributions (INDC), to conform a core of an inclusive global agreement.

The first edition of the NAMA Guidebook was published in February 2014, supported by the Ministry of the Environment, Japan (MOEJ), with contributions by partner countries and research organizations as authors. This guidebook is intended to be a "*living document*" developed jointly by practitioners both in developing and developed countries, and is open to all those interested in contributing with their own experiences. Thanks to good responses, the first edition was very successful, but we have continued to receive further responses and offers by governments, development partners, researchers, and other practitioners. Bearing in mind that there are willingness to share their useful experiences through this guidebook, another invitation was made in several international events, such as the 20<sup>th</sup> Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) in Lima, Peru.

The guidebook has been used and distributed in several international workshops and capacity building activities conducted by the Government of Japan. It has also been distributed as a reference material in UNDP capacity building activities, and the Government of Cambodia is now in the process of translating it into the Khmer language.

Sharing experiences and lessons learned is one of the best ways to train people. As a result, we came to a conclusion that the second edition of the guidebook should include mainly case studies. This guidebook is divided in 3 sections. Section I includes some theoretical aspects not mentioned in the first edition such as NAMAs in the context of national planning and also institutional arrangement for NAMAs. These two parts are followed by an update in the financial and technology transfer aspects of NAMAs. And because of its importance, its timeliness and its strong relation with NAMAs, this section concludes with an overview of biennial update reports (BUR), which were submitted by ten developing countries, and also intended nationally determined contributions (INDC), with the purpose of providing an example on what kind of information to include in such documents.

Section II is completely dedicated to introduce experiences in Asia, Latin America and Africa, through case studies by partner organizations and countries.

The third and final section refers to conclusions, lessons learned and key messages of this guidebook.

The OECC and its partner organizations are working in several programmes related to climate change including the promotion and training of NAMAs. We hope that this publication will serve as a useful tool for practitioners and developing country representatives in their further efforts to move towards low carbon societies.

*Miguel Jiro Ogahara*  
Senior Researcher  
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## Section I: Update in NAMAs Development

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### Introduction and update of key topics on NAMAs

In the absence of specific guidelines from the UNFCCC on how to develop NAMAs, implementing organizations, donors, and host countries have been formulating NAMAs in a trial-and-error basis. By extracting lessons from these experiences, the previous version of this guidebook introduced basic elements of NAMAs and also different approaches for NAMA-related decisions.

Three basic types of support for NAMAs, namely finance, technology and capacity building have been explained extensively in the first edition of this guidebook as well as in different documents published by other organizations. The first part of this section introduces two key topics that should also be taken into consideration: NAMAs in the context of national (climate change) plan, institutional arrangements for NAMAs, which are focused in the recipients of support.

This section is complemented with an update on financial sources for NAMAs as well as technology transfer options through the Climate Technology Centre & Network (CTCN) of the UNFCCC, and the Joint Crediting Mechanism (JCM) promoted by the Japanese government.

Finally, by aiming to share recent information on two key discussions, this section is closed with updates related to Biennial Update Reports (BUR) and Intended Nationally Determined Contributions (INDC).

# Introduction and update of key topics on NAMAs

## 1

## NAMAs in the context of national climate policy planning

By | Frauke Röser, NewClimate Institute

Countries started to develop national climate policy plans following the first UN led international climate conference in 1992. As part of the UN Framework Convention on Climate Change (UNFCCC), countries agreed that policies and measures to protect the climate system against human induced change should be integrated into national development plans and programmes (UNFCCC, Art. 3.4, 1992). Later on at COP 16 in Cancun in 2010, Parties formally agreed to prepare Low Emissions Development Strategies (LEDS) which are nationally driven and take specific national circumstances into consideration.

National climate policy strategies comprise plans to mitigate climate change as well as strategies to respond to the consequences of a changing climate with different emphasis according to the specific circumstances and development objectives of each country. The terminology reflects the particular importance attributed to mitigation, adaption and development and includes, for example, low emissions or low carbon strategies (mitigation focus), climate resilience strategies (adaptation focus) or low carbon/ green growth strategies (economic development focus). But essentially all terms refer to a similar process or output which is a (national) strategy or plan which integrates development objectives and climate change. With their focus on mitigation, low emissions development strategies fundamentally aim to catalyse concrete actions that support development with less emissions than the alternative (ECN, 2013).

This chapter provides a discussion of different elements of climate policy planning focussing in particular on mitigation related aspects given the guide's focus on NAMAs. A description of the national climate policy architecture highlights the relationships of climate planning with NAMAs as well as INDCs. This will be followed by brief conclusions on particular challenges of national planning based on observed current practice.

### National climate policy architecture

Figure 1 below provides a schematic overview of different, mitigation related elements of the national climate policy architecture and how these are interrelated.

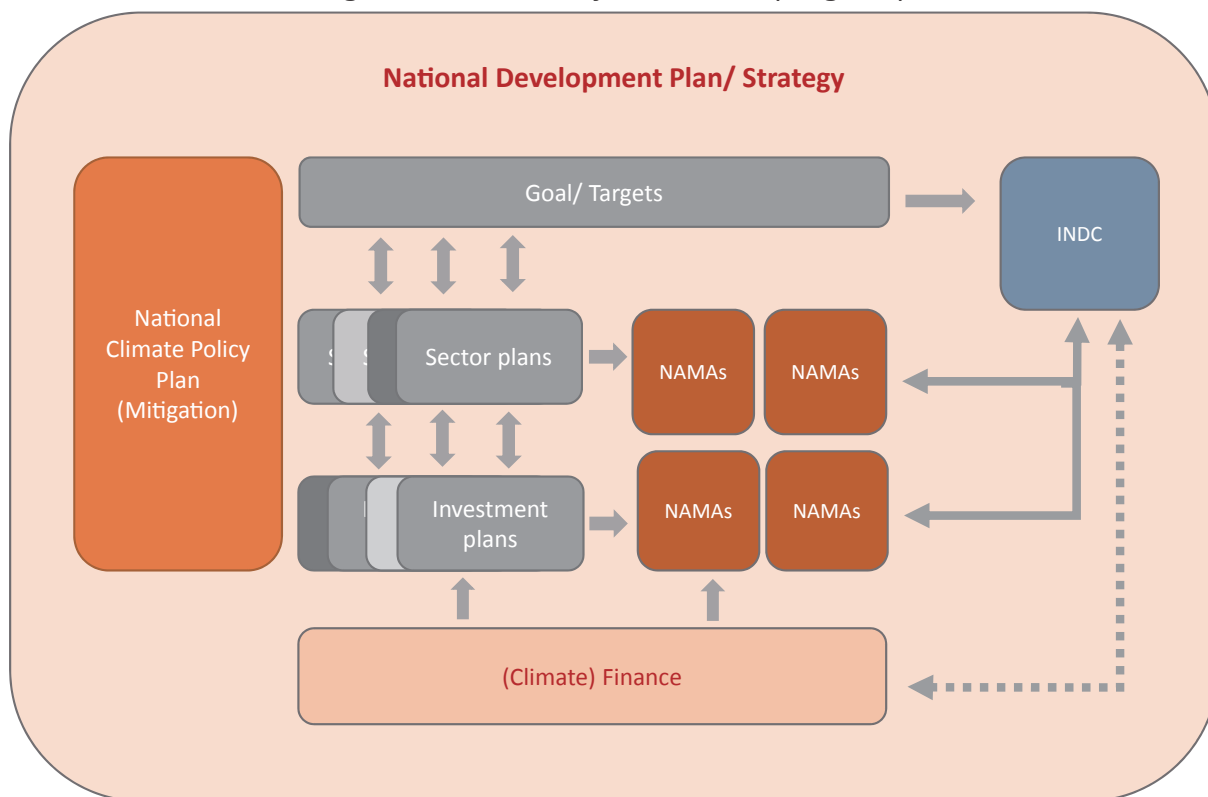
The first important aspect to note is that national climate policy planning should sit within a wider national development plan and strategy which informs the particular direction, objectives and actions included in the national climate policy plan. The national development strategy is typically based on individual sector plans which outline the specific development goals and actions in different sectors. Ideally these should all be interrelated and coordinated between the different responsible ministries, for example, through a national government process or committee which includes relevant decision makers.

The national climate plan itself broadly includes three elements:

- **Goals and targets** – these set out the long term vision as well as short and medium term targets and objectives. Ideally a combination of long and short terms targets is included both at the national (economy wide) as well as sectoral or sub sectoral level.
- **Sector plans** – these include prioritised sector specific mitigation options and actions to reduce



Figure 1: Climate Policy Architecture (Mitigation)



greenhouse gas (GHG) emissions, building on available sectoral development plans. These plans should indicate implementation related aspects on institutional roles, responsibilities, timeframes as well as monitoring frameworks.

- **Investment plans** – outline finance related aspects associated with the implementation of the strategy and sector plans. These may include cost estimations, identification of sources of finance as well as concrete plans on investment flows in line with sectoral action plans. Finance may come from national as well as international sources, including dedicated climate finance as well as development finance or direct investments.

### The role of NAMAs

NAMAs relate to low carbon development strategies or national climate policy plans in several ways. Generally speaking, national climate policy strategies provide the overall vision and NAMAs are a vehicle to implement the vision. National climate policy planning can be seen as a comprehensive process in which NAMAs are identified. NAMAs here can be included in sector specific or cross sectoral plans as concrete actions to develop the plans. Given the flexible nature of NAMAs, they can take different forms: as sector plans, specific policies and programmes or individual projects. Notably, NAMAs also directly link to investment plans providing a framework to define domestic and international support needs and creating mechanisms for channelling (climate) finance to facilitate the implementation of the planned actions.

In reality NAMAs are often not the outcome of a longer term, comprehensive national planning process. Actions may be the result of short term opportunities or political decisions unrelated to low carbon planning (Lütken, 2011). In this case one or several NAMAs may be developed in different sectors, often unrelated and involving a different set of government actors and national stakeholders. Only in

a subsequent phase the NAMAs may then be tied into a strategic framework of climate action which provides the basis for a national climate policy plan. Here NAMAs are the starting point for a national climate planning process.

## The role of INDCs

At COP19 in Warsaw Parties agreed to prepare Intended Nationally Determined Contributions (INDCs) well in advance of COP21 in Paris with those countries “ready to do so” expected to submit their INDCs already in March 2015. INDCs will serve as a key input for the new international agreement on climate change. The Lima Call for Climate Action agreed at COP20 provides guidance on the information to be submitted as part of the INDCs, leaving much flexibility for countries to define their own priorities on how to develop and present their INDC (NewClimate, 2014). Generally speaking, an INDC can take various formats. It can be presented as an economy wide or sector wide long and short term target or a set of targets. It could also be presented as a concrete set of policy actions, or indeed a combination of different targets and specific actions. The format and scope of the INDC depends on the country’s circumstances, capabilities as well as its level of ambition.

In the above diagram it can be seen that INDCs relate to several elements of the national climate policy architecture. For example, goals and targets may directly inform or be translated into the INDC. The INDC can also be based on existing or planned Nationally Appropriate Mitigation Actions (NAMAs). NAMAs themselves may be put forward as an INDC, potentially in combination with a national or sectoral target. More importantly NAMAs, can be one of the mechanisms used to implement the INDC where the INDC is framed as a sectoral or national target. Here it is also important to note the link to (climate) finance and investment plans as well as the potential role of (supported) NAMAs as a mechanism to channel finance<sup>1</sup>. Finance may be used to increase the level of ambition of INDCs where countries decide to include additional (more ambitious) elements conditional to the provision of support.

## Conclusions

A thorough process to analyse different development objectives and options in the context of climate impacts which involves all relevant stakeholders is likely to result in a more balanced and effective strategic framework. Countries’ political, institutional and economic realities however do not always allow for such well-planned and inclusive strategic processes to happen. The coordination of different stakeholders requires strong leadership and careful planning. Also the interrelatedness of topics and development challenges makes the process highly complex. The necessary detailed information and data may not be available, and often trade-offs will have to be made when prioritising different development and climate change objectives.

Given the complexity of the task and the often constrained available resources, any starting point to develop a national climate plan is valuable, be it as a dedicated climate planning process or starting from concrete existing or planned actions and projects. NAMAs can play a key role to advance concrete actions, building on existing initiatives and processes. This in turn provides a good basis to drive the development of a more strategic and comprehensive long term framework. At the same time NAMAs help to address one of the other key challenges of national climate planning, which is to turn plans into

<sup>1</sup> Note here that the timeframe for NAMAs was originally until 2020 whereas INDCs are expected to be implemented beyond 2020. It is expected that given their current relevance and relative maturity as a mitigation mechanism, NAMAs continue to play a role in the context of a new global agreement.

action on the ground.

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## 2

## Institutional arrangements for NAMAs and MRV

By | Makoto Kato and Jiro Ogahara, Overseas Environmental Cooperation Center, Japan (OECC)

In operationalizing NAMAs, it is important for developing countries to move for setting an appropriate domestic institutional arrangement that supervises and coordinates stakeholders taking mitigation actions as well as their MRV. As actions related to mitigation, such as energy, transport, agriculture, etc. are administered within the existing national jurisdictions for sectors, in most cases ministries in charge of relevant sectors may cover responsibilities of such actions as mitigation efforts, including the elaboration and promulgation of policy and legal instruments (master plans, programmes, and regulations etc.), mobilizing finance (budget and finance for investments from different sources, such as national budget and the private sector), providing technical expertise, etc. However, as NAMAs are actions pledged by developing countries at the UNFCCC, mitigation actions need to be officially labelled as NAMAs, and formally communicated through UNFCCC focal points.

While NAMAs themselves does not need to be separated from regular mitigation related actions<sup>1</sup>, a national decision making process needs to be in place. At the same time, information such as assumptions and methodologies, sectors and gases covered, global warming potential values used, support needs for implementation, etc. are expected to be clarified when submitting NAMAs and BUR, and hence, it is also important that such technical elements should be coordinated.

Also, a properly designed institutional arrangement is useful when working with development partners. In spite of availability of resources from the international donor community, one of the main causes for donors not to intervene is when a host country's institutional arrangement is not in place. In the absence of an effective coordination with donors, line ministries and sub-national organizations can cause a duplication of efforts, by applying to same funds with different projects, applying similar projects with the same objective, etc. A single-window that can deal with donors such as the climate change authority can

<sup>1</sup> For example, a country with a sustainable transport policy may formulate it or call it as a “NAMA” , which contains several actions that can reduce or mitigation GHG emissions. It is rather difficult and unnecessary to single out and separate actions as stand-alone ones only for NAMAs.

minimize this kind of risk while at the same time, showing to the international community the possibility to conduct projects in an organized manner.

## Building upon and strengthening existing domestic bodies

In practice, many countries have already established an inter-ministerial coordination body for climate change, often called “national climate change committee (or NCCC)” , in which major relevant ministries<sup>2</sup> participate. Driven by necessities to deal with political or technical matters relating to climate change, such as international negotiations, the preparation and submission of national communications, as well as approvals for the CDM, and monitoring and evaluating of progress made through these actions, an important decision making role was taken by such a committee in many countries.<sup>3</sup> Although it is not proper to say mandates of, scopes of activities for, and the level of decisions made by such a committee, are similar. It is safe to say that the experience of establishing and organizing a NCCC may potentially be useful in dealing with NAMAs and MRV.

**Table 1 : Typical institutional arrangements available in developing countries**

	Substantive working areas	Work with a NCCC or its subgroups	Experiences useful for NAMAs and MRV	Remarks
1	Climate change policies, strategies, master plans, etc.	Overall coordination, decision making, and guidance for ministries, local governments, and other stakeholders.	Inter-ministerial coordination, distribution of responsibility thru bottom-up and top-down ways etc.	For technical matters such as scenario making, ensuring the consistency across sectors may be useful
2	GHG Inventory	Periodical reporting of the results of compilation, and setting official government figures (such as emission factors)	Data and information gathering across ministries and other stakeholders	GHG inventory provides information of emissions, instead of emissions reduction ( <i>cf.</i> the CDM)
3	CDM and other market mechanisms	National approval of mitigation projects	Approval procedure, criteria, and report on project status.	NAMAs are not necessarily on a project-basis only.
4	Monitoring and evaluation of policies, etc.	Progress check of actions and activities related to climate change, such as the implementation of instruments in (1) above.	Report from ministries, local governments, and other stakeholders on the status of implementation	Contents of such reports may vary, so that guidelines (such as topics, data etc.) and standardized formats are useful .

In addition to “labelling”<sup>4</sup> mitigation-related actions as NAMAs through national decision making, it is important to monitor the progress of such actions, by collecting information which may provide the basis for MRV at the national level. In this regard, lessons should be learned and efforts of MRV may be built

<sup>2</sup> In other case, key stakeholders such as local governments, the private sector, and NGO representatives are also invited to participate in.

<sup>3</sup> On the other hand, at early stages and still currently in some countries, these matters are dealt in an ad-hoc basis, by establishing working groups. However, in a more integrated manner, other countries try to link between such technical working groups and NCCC, by placing the former as subsidiary groups.

<sup>4</sup> To “label” as NAMA, as required by 1/CP.16, actions should be aimed at achieving a deviation from business as usual emissions in. 2020.

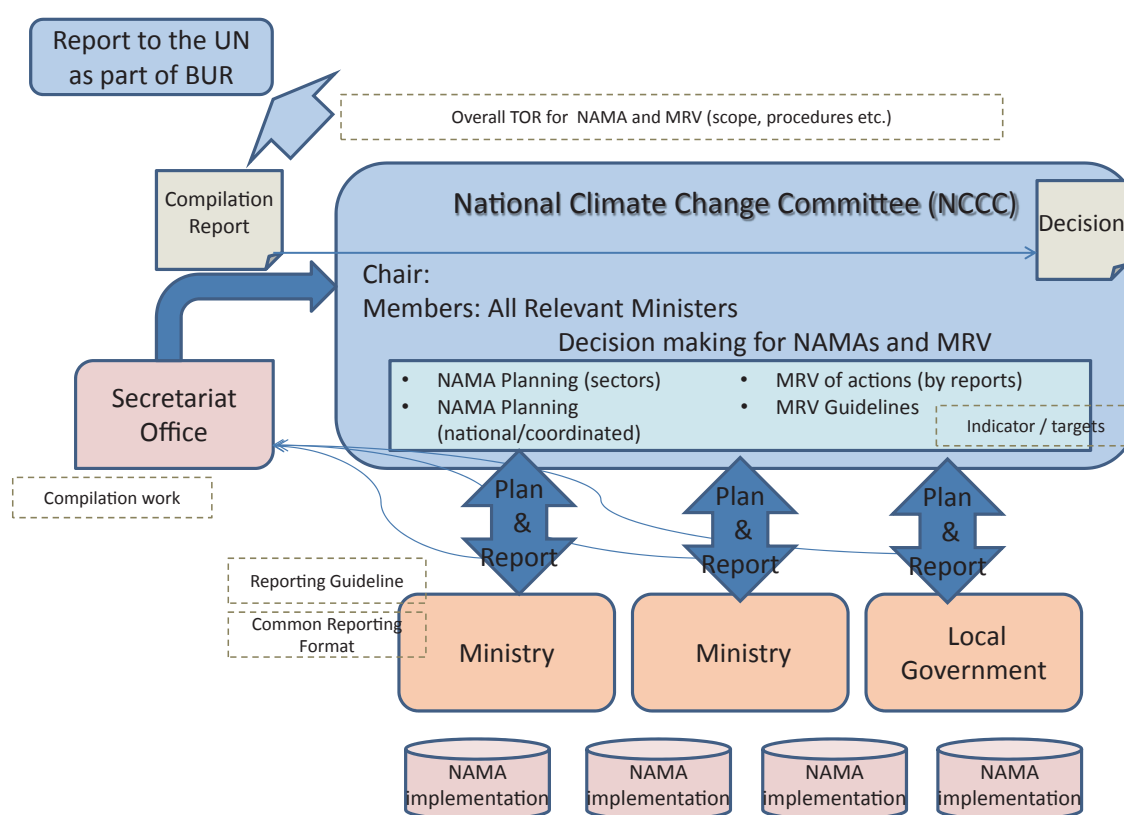


upon information and data collection or reporting system, as shown in 2 and 4 of table 1. In many cases, countries had these experiences in the past, hence it may be practical to build upon those experiences and reformulate existing domestic bodies into a NAMA governing body. Also, it is highly recommended that such NAMA governing body should always be a part of, or function through an existing national climate change institutional arrangement, and not as a newly established stand-alone body.

## Elements for terms of reference of the institutional arrangement

However, the domestic existing bodies were established to deal with similar but different purposes. It may be useful to analyse what is already covered by this similarity and what is missing. Especially in this context, it is important to consider the following elements as part of the terms of reference. According to the following institutional model in Figure 1, the role of a NAMA governing body and functions that stakeholders may assume are shown. While Figure 1 shows an image of a relatively large scale national body, like a National Climate Change Committee, this institutional model may be applied to a small scale or even a committee established in an ad-hoc basis. Depending on national circumstances, some application may be important.

Figure 1: Institutional Model for NAMAs and MRV



Source: own elaboration

Table 2: Possible roles of NAMA governing body

	Stage	Role of NAMA governing body	Functions that may be assumed by stakeholders (e.g. line ministries)
1.	Planning NAMAs	<ul style="list-style-type: none"> <li>● Provide guidance on political and technical<sup>5</sup> matters, including how to prepare NAMAs</li> <li>● Approve sectoral mitigation plans elaborated by line ministries</li> <li>● Establishment of a Secretariat to deal with and support NAMA related work</li> </ul>	<ul style="list-style-type: none"> <li>● Plan mitigation actions in relevant sectors.</li> <li>● Submit the plans to the NAMA governing body</li> <li>➢ <i>Secretariat / ministry should prepare for draft guidance</i></li> </ul>
2.	Implementing NAMAs	<ul style="list-style-type: none"> <li>● Overview of the implementation process</li> <li>● Decision-making when needed</li> </ul>	<ul style="list-style-type: none"> <li>● Implement actions to reduce or mitigate GHG emissions.</li> <li>● Make financial arrangements for implementation</li> <li>➢ <i>Secretariat / ministry should provide technical information and support</i></li> </ul>
3.	MRV	<ul style="list-style-type: none"> <li>● Provide technical guidelines for reporting, such as format and contents to be included.</li> <li>● Endorse the results, based on analysis (such as aggregation of results) and decide further necessary actions.</li> </ul>	<ul style="list-style-type: none"> <li>● Formulate reports in accordance with the guideline.</li> <li>● Provide reports on the progress of implementation</li> <li>➢ <i>Secretariat / ministry should draft guidelines</i></li> <li>➢ <i>It should also compile and analyse reports of NAMA results.</i></li> </ul>

## References

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## 3 NAMA Support Schemes

By Yuqing Ariel Yu, Kentaro Tamura, Koji Fukuda and Noriko Shimizu, Institute for Global Environmental Strategies (IGES)

NAMA support schemes provide financial, capacity building and technology resources for developing countries to be used in the formulation and implementation of NAMAs. It should be noted that a NAMA support scheme is not identical to a NAMA finance scheme. NAMA finance addresses the question of how to design financial mechanisms to attract capital from international and/or domestic investors for proposed NAMAs; whereas NAMA support focuses on providing financial and non-financial resources (i.e., capacity building and technology) to facilitate the preparation and implementation of NAMAs. It is also important to note that internationally supported NAMAs only account for one portion of existing NAMAs—many NAMAs are developed and implemented by developing countries unilaterally. This article focuses on the existing NAMA support programs and does not specifically address the question of designing finance schemes to fund NAMAs.

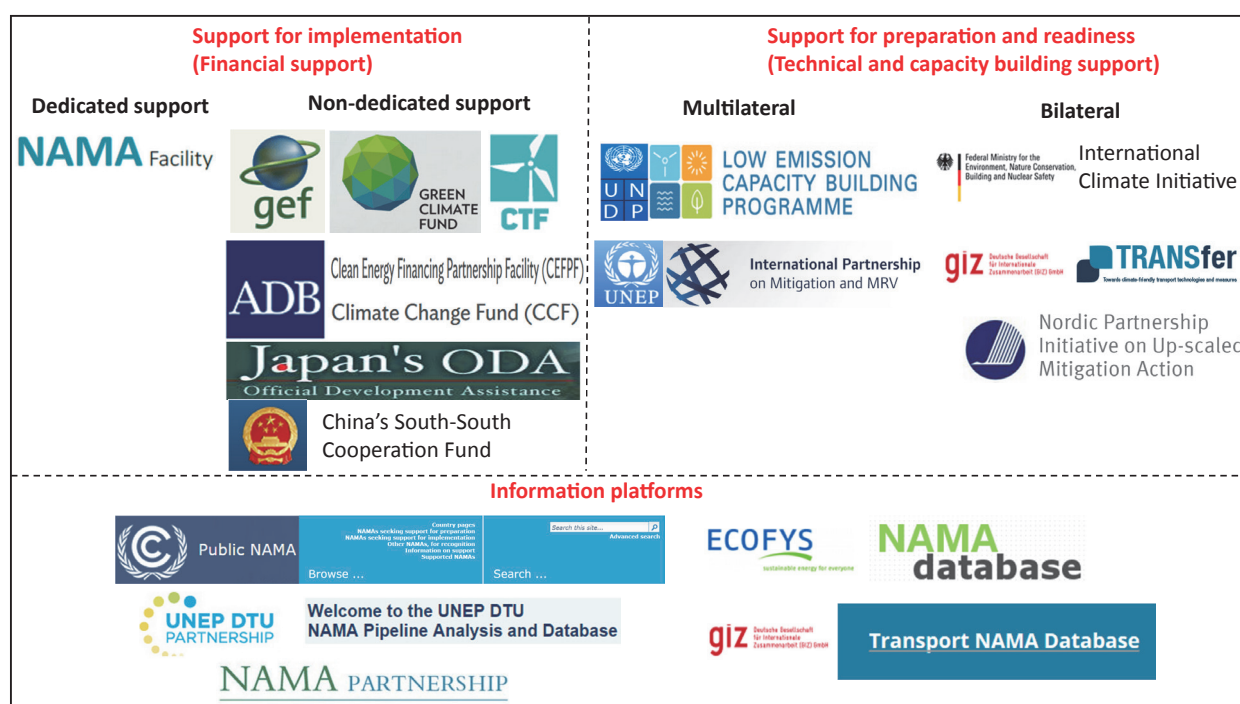
<sup>5</sup> In order to ensure the consistency of approaches, technical guidance may include assumptions and methodologies, sectors and gases covered, global warming potential values used, etc., which are often based on scientific studies conducted by line ministries in relevant sectors. In practice, actual matters to prepare such guidance should be conducted by ministries in charge of the secretariat.

NAMAs tend to focus more on integrating climate policy actions with the sustainable development goals of developing countries, and therefore NAMA support, in principle, should be conducive to transformational change. The concept of transformational change towards sustainable development is new and will likely be adjusted as knowledge evolves. Yet, a NAMA support program can be considered as having the potential for transformational change if it meets the criteria of (the NAMA Facility, 2014):

- contributing to enabling either a significant and/or a faster evolution in terms of scope (e.g., scaling-up or replication);
- having a catalytic effect and including mechanisms to ensure the sustainability of the impacts, and;
- allowing for systematic learning processes.

NAMA support should also not be limited to specific projects but rather include programs based on and available to the entire sector or industry. However, the lack of a clear definition for a NAMA indicates that there exists considerable room for flexibility and customization when implementing NAMA programs. The existing NAMA support programs can be categorized into three types—support for (Figure 1) implementation, support for preparation and readiness, and information platforms.

Figure 1: Existing NAMA support programs



## Support for implementation

### Dedicated support

Only two facilities—the NAMA Facility and the EU-Africa Infrastructure Trust Fund—are dedicated to supporting NAMA implementation. Since the Infrastructure Fund has a regional scope of Africa, the NAMA Facility has become the first and only funding source available for other countries to seek dedicated support for NAMA implementation.

### *The NAMA Facility*

Established at the Doha COP in 2012, the NAMA Facility<sup>1</sup> is funded by Germany and the United Kingdom (UK) with an initial joint contribution of EUR 70 million and an additional funding of EUR 50 million contributed in 2014. The NAMA Facility addresses the demand for tailor-made climate finance and funds the implementation of ambitious NAMAs. There are 8 projects under appraisal and one project under implementation as of January 2015.

Indonesia's Sustainable Urban Transport Program (NAMA SUTRI) is one Asian project under appraisal. This initiative revolves around the goal of achieving urban transport emissions of 15% below the business-as-usual (BAU) scenario by 2020 in specific pilot cities. The NAMA Facility will fund the running costs of a Technical Support Unit and contribute to a Sustainable Urban Transport Fund. Indonesia commits to contribute at least €2 for each €1 received from the NAMA Facility. Thailand's Refrigeration and Air Conditioning NAMA (RAC NAMA) is another example of Asian project under appraisal. This NAMA aims to result in an annual reduction of around two million tonnes by 2020, which accounts for 0.6 per cent of the Thai total GHG emissions compared to BAU. With the support from the NAMA Facility, the RAC NAMA will establish a GreenRAC Innovation Fund that will provide seven times as much as the seed funding.

### *Other dedicated support*

The Cook Islands' NAMA involving support for the implementation of 100% renewable electricity sources by 2020 has received funding from Japan under the Pacific Environment Community Fund for the purchase and installation of solar photo voltaic systems for several islands with funding from New Zealand for the remaining islands (Cook Islands, 2012).

### **Non-dedicated support**

There are many multilateral and bilateral financial institutions which are not dedicated to supporting NAMAs but have supported mitigation actions as a part of their activities. The following institutions do not make up of a comprehensive list, but include some of the most prominent multilateral and bilateral financial institutions that have delivered mitigation finance to Asia.

### *The Global Environmental Facility*

The Global Environmental Facility (GEF), the operating entity of the UNFCCC financial mechanism since 1991, has distributed the largest amount of mitigation finance to date but is in fact not dedicated to supporting NAMA implementation. The GEF fourth and fifth replenishments (2006-2014) resulted in only two approved Asian projects having been specified in title as NAMA projects, although many projects may actually be closely analogous to NAMAs and have the potential to be recognized as NAMAs by recipient countries in the future. The two projects, Azerbaijan's NAMAs for low-carbon end-use sectors and Kazakhstan's NAMAs for low-carbon urban development, are both at the preparation stage and GEF will commit USD 0.1 million and USD 5.93 million to the projects, respectively.

### *The Green Climate Fund*

At COP 20 in Lima, the Green Climate Fund (GCF) completed its initial mobilization process, which led to total pledges of USD 10.2 billion from 27 contributing Parties. The GCF is scheduled to initiate procedures for accrediting implementing entities in March 2015 and accelerate the operationalization of the mitigation window with adequate resources allocated for capacity building and technology

<sup>1</sup> The NAMA Facility: <http://www.nama-facility.org>



development and transfer.

Since both NAMAs and the GCF seek to promote the paradigm shift towards low-emission and climate-resilient development pathways, it is believed that the GCF could and should support NAMAs (Friman, et al., 2014). However, it is worth recalling that the GCF does not have the mandate to support NAMAs in particular; only that it will support mitigation actions that may—as its governing instrument specifies—include NAMAs (GCF, 2011). For the GCF to be effective in supporting NAMAs, it is crucial that the GCF builds the capacity of balancing different expectations on NAMAs by contracting Parties (Friman, et al., 2014).

#### *Multilateral development banks*

Although multilateral development banks (MDBs) have shown little indication on whether or not NAMAs are explicitly included in their approach, the experience gained and knowledge obtained from using MDBs to support mitigation actions will enable them to become a potentially important channel for NAMA financing. The World Bank's Clean Technology Fund is supporting mitigation actions in six Asian countries<sup>2</sup> and has supported 27 projects in East Asia and the Pacific, which amounted to USD 1,191 million since its inception. The Asian Development Bank's Clean Energy Financing Partnership Facility and Climate Change Fund are the key mechanisms used to mobilize resources in the Asian region for use in addressing climate change mitigation through technical assistance and grant components of investment projects.

#### *Bilateral support*

Japan's mitigation finance is sourced from existing aid commitments and is flowed through a decentralized, fragmented system dominated by line ministries—including Ministry of Foreign Affairs; Ministry of Economy, Trade and Industry; Ministry of the Environment; and Ministry of Finance—and bilateral aid agencies, such as Japan International Cooperation Agency and Japan Bank for International Cooperation. Japan, which is known for its focus on mitigation and its fast-start finance (FSF) has been primarily comprised of mitigation finance, with only 11% of the total FSF contributed to adaptation (Nakhooda et al., 2013). However, Japan has not been dedicated to financing NAMA implementation and its support recorded in the NAMA Registry is limited to preparation of NAMAs.

In addition to the North-south flows, South-south flows have emerged as a new channel for NAMA support. The Chinese government launched a new multimillion-dollar south-south cooperation fund at COP20 and will pledge USD 20 million annually to the fund (Friedman, 2014). South-south cooperation has been gradually gaining its attention, especially after the GCF capitalized by some developing countries, and it will present opportunities for innovative climate financing.

## Support for preparation and readiness

To date, the majority of NAMA support has focused on preparatory and readiness activities. These activities incorporate a broad range of elements and focus on different phases of NAMA development, from awareness rising and institutional creation to NAMA proposal development (Tilburg et al., 2012). In some cases, NAMA readiness support is combined with support for related concepts such as low-emission development strategies or monitoring, reporting and verification (MRV) systems. It is also observed that support for NAMA readiness has been separated from support for NAMA implementation;

<sup>2</sup> CTF Asian countries are Indonesia, Vietnam, India, Kazakhstan, Philippines, and Thailand.

that is, those who have supported NAMA preparation are yet to have also committed to financing any resulting NAMAs (Cameron, 2012). This dichotomy of NAMA support therefore leads to the question of coherence and coordination being involved in international support.

#### *UNDP's low emission capacity building programme*

Several United Nations (UN) agencies are taking the lead in supporting the preparation of NAMAs. UNDP's Low Emission Capacity Building Programme (LECB) aims at strengthening technical and institutional capabilities at the national level for identifying and formulating NAMAs. It will provide four types of technical and capacity building support—(1) providing appropriate tools and training available in the context of national priorities, (2) providing targeted technical support to national teams for the implementation of project activities, (3) providing support for the identification of innovative policy and financing options to facilitate partnerships between the public and private sector, and (4) disseminating knowledge and lessons learned to raise awareness, engage stakeholders and inform decision makers. The LECB is supported through contributions from the European Commission, the German BMU, the Australian Department of Climate Change and Energy Efficiency, and AusAID, while it is implemented by the UNDP. This program runs through 2016 and is active in 25 countries throughout the world.

#### *UNEP's Facilitating Implementation and Readiness for Mitigation*

UNEP's Facilitating Implementation and Readiness for Mitigation aims at strengthening national mitigation plans and provides developing countries with a quick start on NAMAs. It is funded by Denmark and is implemented by the UNEP from 2011 to 2020.

#### *The International Climate Initiative*

With regard to NAMAs, the International Climate Initiative (IKI) complements the German government's existing international cooperation and support partner countries in developing NAMAs, implementing ambitious components of NAMAs, and gaining access to funding for implementation. In addition to mitigation, the IKI also supports (1) adapting to the impacts of climate change, (2) conserving national carbon sinks with a focus on reducing emissions from deforestation and forest degradation, and (3) conserving biological diversity. The IKI receives EUR 120 million from the German Government every year and the Energy and Climate Fund, which is replenished through the auctioning of emission allowances in the EU ETS, contributes additional funds to the IKI.

#### *TRANSfer*

TRANSfer is a NAMA preparation initiative led by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and has developed climate change strategies within the transport sector for registration as NAMAs. Indonesia is the partner country in Asia and GIZ is providing technical assistance to Indonesia's NAMA SUTRI in the context of the TRANSfer project. As NAMAs in the transport sector develop, TRANSfer will serve as an umbrella to use a common NAMA approach so as to foster quality assurance, synergies between projects, and a clear external representation.

#### *The Nordic Partnership Initiative*

The Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) established the Nordic Partnership Initiative on Up-scaled Mitigation Action (NPI), along with Peru and Vietnam in 2011. This initiative supports government agencies to acquire data collection skills and framework formulation regarding reduction in energy intensity and so far, two pilot programmes are under implementation. The NPI programme in Vietnam focuses on the cement sector, which has started in March 2014 and will continue until March 2016. The budget for the Vietnam Pilot Programme is EUR 1.6 million and is

expected that the MRV system of the cement sector will be in place at the end of the implementation.

## Information platforms

Information platforms are not support programs by themselves, but provide pertinent information with the purpose of increasing the opportunities for supporting the preparation and implementation of NAMAs. The NAMA Registry, the NAMA Pipeline, the NAMA Database, and the NAMA Partnership are important information and knowledge sharing initiatives.

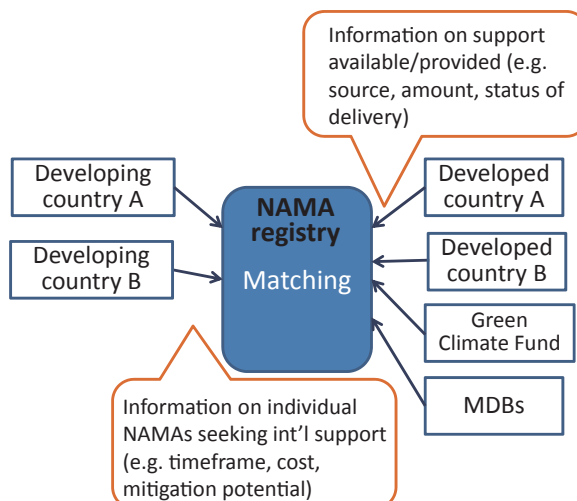
### *The NAMA Registry*

The NAMA Registry<sup>3</sup> is a publicly available online platform operated by the UNFCCC Secretariat that serves to (1) record information for all NAMAs seeking support and facilitate matches between NAMAs seeking support with financial, capacity building and technology support provided by Annex I Parties and Organisations, and (2) recognize developing countries' mitigation efforts by encouraging them to enter information for unilateral NAMAs (Figure 2).

Since its official operations started in October 2013, the NAMA Registry contained 62 NAMA entries and 14 sources of support as of November 6, 2014. The NAMA Registry had recorded the matching of eight NAMAs with sources of support, including six NAMAs seeking for preparation and two NAMAs seeking for implementation.

The total amount of available support currently recorded in the NAMA Registry is USD 27.4 million, of which USD 1.9 million (7 percent) is for NAMA implementation and USD 25.5 million (93 percent) is for NAMA preparation (UNFCCC, 2014a). However, the amount of available support falls significantly short of the amount sought by developing countries. According to the 11 entries that provide information on incremental costs of NAMAs in 2014, incremental costs of NAMAs on average account for 9 per cent of the full costs of the relevant NAMAs. As of 6 November, 2014, the total amount of support sought for NAMAs amounted to USD 6.5 billion in the NAMA Registry (UNFCCC, 2014b). The average 9 per cent ratio of incremental costs in the full costs of NAMAs indicates that developing countries are seeking support of USD 589 million.

**Figure 2: Matching Function of the NAMA Registry**



<sup>3</sup> The NAMA Registry: [http://unfccc.int/cooperation\\_support/nama/items/7476.php](http://unfccc.int/cooperation_support/nama/items/7476.php)

### *UNEP's NAMA Pipeline Analysis and Database*

Built upon UNEP's CDM/JI Pipeline expertise, the NAMA Pipeline<sup>4</sup> was launched in 2011 as an informal platform that provides an overview of the activities that have been submitted to the UNFCCC as NAMAs, even where these submissions have not yet been formalized. Supplementing the official registries, the NAMA Pipeline provides users with options for creating their own statistics as well as a visual presentation of the submitted NAMAs.

### *Ecofys's NAMA Database and GIZ's Transport NAMA Database*

Ecofys's NAMA Database<sup>5</sup> is an interactive wiki-based portal that allows users to make edits to the Database and hence shares publicly available information on the development of NAMA-related feasibility studies and NAMA proposals that are not yet officially submitted to the UNFCCC. The NAMA Database is also linked to a Transport Database<sup>6</sup>, an open platform in the same format that provides access to NAMAs in the transport sector at all stages from initial concept to implementation.

### *The NAMA Partnership*

Launched at the Doha COP in 2012, the NAMA Partnership<sup>7</sup> is a group of 20 multilateral organizations, bilateral cooperation agencies and think tanks<sup>8</sup> that produce occasional papers, webinars and a web-based platform for knowledge sharing around NAMAs. The NAMA Partnership implements activities through three working groups—NAMAs in the context of national development; NAMA finance; and measurement, reporting and verification aspects of NAMAs—and aims to enhance collaboration and complementarity of the different organizations to accelerate support in preparation and implementation of NAMAs.

## Conclusion

To date, few resources have committed to provide financial support for NAMA implementation; most of NAMA support programs have focused on providing technical and capacity building support for NAMA preparation and readiness. No multilateral financial institutions have explicitly earmarked funding for NAMA implementation and the NAMA Facility has been the first and only source for Asian countries seeking financial support for NAMA implementation.

The lack of financial support for NAMA implementation can be explained by the observation that the implementation of NAMA finance is different from and possibly at odds with current practice of climate finance. The existing literature concludes that contributors tend to pursue self-interested purposes when delivering mitigation finance pledges and predispose toward developmental purposes when channelling

<sup>4</sup> The NAMA Registry: <http://namapipeline.org/>

<sup>5</sup> The NAMA Database: [http://www.nama-database.org/index.php/Main\\_Page](http://www.nama-database.org/index.php/Main_Page)

<sup>6</sup> The Transport NAMA Database: [http://www.transport-namadatabase.org/index.php/Main\\_Page](http://www.transport-namadatabase.org/index.php/Main_Page)

<sup>7</sup> The NAMA Partnership: <http://www.namapartnership.org>

<sup>8</sup> The 20 partners of the NAMA Partnership are: 2 UN agencies (UNEP DTU Partnership, formerly UNEP Riso Centre, and UNDP); 5 Development Banks (the Inter-American Development Bank, the Nordic Environment Finance Corporation, the World Bank, the African Development Bank, the Asian Development Bank); 6 Bilateral Organizations (Agence Francaise de Development, Japan International Cooperation Agency, KfW, Deutsche Gesellschaft für Internationale Zusammenarbeit, International Fund for Agricultural Development, United States Agency for International Development); 7 think tanks (the Climate Policy Initiative, World Resources Institute, Climate Markets and Investment Association, Centre for Clean Air Policy, Climate Works Foundation, World Business Council for Sustainable Development, Organization for Economic Cooperation and Development)



adaptation finance pledges (Lancaster, 2007; Pickering et al., 2015). The preference for bilateral channels over multilateral channels and the overwhelming reliance on multilateral channels outside the UNFCCC—notably the Climate Investment Funds, whose operations are closely related to the World Bank and other MDBs—are another examples of the tendency for addressing self-interest. During the FSF period, around two-thirds of the FSF has been flowing through bilateral mechanisms, with only two per cent of the total FSF flowing through UNFCCC related funds (Ciplet et al, 2012; Nakhooda et al., 2013).

In contrast, NAMA finance will be delivered in the context of sustainable development and be used to address national priorities of developing countries. Over the last thirty years, the history of global environmental discourse has witnessed a transformation of developing countries' engagement. The pre-Stockholm era (before the 1972 United Nations Conference on the Human Environment) was exemplified by a politics of contestation by developing countries; and it was not until the post-Rio period when the concept of sustainable development was accepted at the 1992 Rio Summit that developing countries have been seen with more meaningful, but still hesitant, engagement in global environmental governance (Najam, 2005). However, discourse is different action. Although the concept of sustainable development has been accepted at the discourse level, a similar level of acceptance has not been observed at the implementation level. In fact, the evolution of action has been much slower than that of discourse and developing countries' frustration has tended to grow rather than recede over time (Najam, 2005). Similarly, the request for internalizing development concerns in the context of NAMAs has been accepted at the conceptual level, but does not correspond with the interest and practice of contributors at the implementation level.

An in-depth analysis reveals that there exists variation among contributors on the extent to which they seek developmental and self-interested purposes. A considerable degree of variation can be explained by the country difference in institutional configurations and relative influence of key ministries. For example, Germany and the UK have aid ministries that predispose toward developmental purposes at the ministerial or cabinet level; in contrast, Japan and the United States (US) have a decentralized system and decision-making is made in a fragmented way among many actors (Lancaster, 2007). Consequently, Germany and the UK represent one end of the spectrum that exhibits a preference for multilateral channels for developmental purposes, while the US and Japan represent the other end who relies mostly on bilateral agencies and emphasizes mitigation and private finance (Pickering et al., 2015). In the case when no individual ministry prevails, variation on decision-making may also result from the extent to which the interests of different ministries align with one another (Pickering et al., 2015).

In addition, the lack of financial support for NAMA implementation also results from the inability of developing countries to demonstrate finance transparency, a prerequisite for NAMAs that receive external support. Developed countries are keen to know what environmental outcomes have resulted from the millions of dollars flowing into developing countries, who receives the money, and how it is spent. However, the lack of a universally accepted NAMA definition indicates the lack of a common approach for MRV NAMAs and NAMA finance; not to mention that developing countries do not have the technical capacity for MRV. It should also be noted that the meaning of effectiveness is different to developed countries and developing countries. Developed countries tend to highlight the environmental aspects of climate finance effectiveness; in contrast, developing countries tend to be less concerned about the environmental aspects but highlight the developmental aspects (Najam, 2005). In practice, the dominant scholarship on environmental governance has discussed the issue of environmental effectiveness exclusively in the lens of the environmental aspects, without much focus on the developmental aspects (Najam, 2005).

Finally, the diverging views with regard to the additionality principle as well as the role of private finance also contributes to the lack of NAMA financial support. Developed countries have at times relabeled existing official development assistance (ODA) finance as climate-related to count it toward their climate finance portfolio (Nakhouda et al., 2013). However, the additionality principle, the common but differentiated responsibility principle and the polluter pays principle established the legitimacy of climate finance in the eyes of developing countries (Najam, 2005). For developing countries, the significant difference between ODA finance and climate finance does not lie in whether ODA finance can produce climate co-benefits, but rather climate finance should be compensatory in nature but ODA finance is not necessarily for compensation purpose. Developing countries therefore do not consider private finance as a legitimate source; nor do loans and any financial instruments that require them pay back.

The operationalization of the NAMA Registry and other information platforms are helpful in improving transparency. However, climate finance disagreements have occurred at various levels—between developed and developing countries, between different contributor countries, and between various agencies and ministries within a country—and have contributed to the ambiguity, fragmentation and insufficiency of NAMA financial support. This suggests that a substantial shift in NAMA financial support may only become more likely if control over decision-making is vested in a multilateral institution—such as the GCF—whose representation of developed and developing countries' interests is more balanced (Pickering et al. 2015).

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## 4 Technology transfer support schemes for NAMAs

### 4.1 Linking NAMAs with the Joint Crediting Mechanism (JCM)

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#### Background

The purpose of this article is to introduce a new market mechanism proposed by Japan called Joint Crediting Mechanism (JCM), analyze the relation between JCM and NAMAs, and provide some considerations for its implementation.

#### Carbon market mechanisms and the Joint Crediting Mechanism (JCM)

Carbon market mechanisms are defined as “tools to achieve reduction of greenhouse gases (GHG) emissions and encourage uptake of clean technology and practices” (Briner and Pragg, 2013). The Joint Crediting Mechanism (JCM) refers to a market mechanism agreed upon between Japan and a developing country, to implement mitigation actions in the later through introduction of advanced low carbon technologies.

Japan introduced this initiative aiming at supporting developing countries in their efforts to mitigate the effects of climate change and achieve a low-carbon growth. Taking advantage of Japan’s extensive stock of advanced low-carbon technologies, it was determined that an alternative mechanism mobilizing these technologies, together with finance and capacity building was feasible, with the ultimate aim of achieving the 2°C goal of the UNFCCC and realizing a low-carbon society.

Government’s consultation with interested countries and preparation through feasibility studies and capacity building started in 2011, and the first 9 agreements for JCM were signed by Mongolia, Bangladesh<sup>1</sup>, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia and Costa Rica. Last year Palau, Cambodia and Mexico also joined the process.

<sup>1</sup> Bangladesh is the only country that has signed an agreement under the denomination of “Bilateral Offset Credit Mechanism” (BOCM).

## Relation with UNFCCC decisions

JCM is one of various approaches Japan and partner countries are jointly developing and implementing, and is intended to contribute by following discussions under the UNFCCC. As a regulatory basis for new mechanisms (including JCM), the Cancun Agreement (decision 1/CP.16 para 80) considers “... the establishment, of one or more market-based mechanisms to enhance the cost-effectiveness of, and to promote, mitigation actions...”

Additionally, decision 1/CP.18 para 41 acknowledges that “... Parties, individually or jointly, may develop and implement various approaches, including opportunities for using markets and non-markets, to enhance the cost-effectiveness of, and to promote mitigation actions, bearing in mind different circumstances of developed and developing countries...”

Currently, discussions on how the components and rules that all approaches (including JCM) will meet certain standards are being discussed in the Framework for Various Approaches (FVA) under the UNFCCC.

## Schemes of the JCM

### Definition

The JCM is a project-based scheme initiated through the signature of a bilateral agreement between Japan and developing countries, to conduct mitigation actions under three main characteristics:

- Facilitate diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contribute to the sustainable development of developing countries.
- Appropriately evaluate contributions to GHG emission reductions or removals from Japan in a quantitative manner, by applying measurement, reporting and verification (MRV) methodologies, and use them to achieve Japan's emission reduction target.
- Contribute to the ultimate objective of the UNFCCC by facilitating global actions for GHG emissions reductions or removals, complementing the CDM.

### Types of support

In Japanese Fiscal Year 2014, the Ministry of the Environment of Japan (MOEJ) financed JCM-related projects and activities through the following schemes:

- JCM large-scale project development (approx. USD 16 million)
- JCM development and implementation projects (approx. USD 2 million)
- Financing program for JCM projects (approx. USD 12 million)
- New support program enabling “leapfrog” development fund
  - ✓ (New) Cooperation fund with JICA (approx. USD 4.2 million)
  - ✓ (New) ADB trust fund (approx. USD 1.8 million)

The JCM Financing Scheme provides funds to cover up to half of project's investment costs to international consortiums formed between foreign and Japanese entities. The budget for FY2014 is for approximately USD 12 million per year totaling USD 36 million by FY2016.

The JCM Promotion Scheme is divided into a) Capacity Building Programmes to facilitate understanding on the JCM rules and guidelines, and enhancing capacities to implement MRV, targeting at Asia, Africa, Latin America, and Small Island countries; and b) Feasibility Study Programmes, explained in the table below.

Table 1: Studies under the JCM Promotion Scheme by MOEJ

Type of Study	Contents
1.JCM Project Planning Studies (PS)	To develop a project in the next fiscal year
2.JCM Feasibility Studies (FS)	To survey the feasibility of potential JCM projects
3.Large Scale JCM Feasibility Studies	To survey the feasibility of potential large scale JCM projects including city level cooperation

Source: Ministry of the Environment, Japan (MOEJ). (2014). "A proposal for our future – Towards low carbon growth through the Joint Crediting Mechanism"

## Examples

### a) "Small-scale biomass power generation with stirling engine"

<b>Project site</b>	Cambodia (Provinces of Kandal, Kampong Cham, Kampong Speu)
<b>FY</b>	FY 2012
<b>Category of Project</b>	Biomass utilization
<b>Main implementing entity</b>	Pro-Material Co., Ltd.
<b>FS Partners</b>	-Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. -Meisei University -Angkor Bio Cogen Co., Ltd.
<b>Description of project</b>	The purpose of the project is to reduce greenhouse gas (GHG) emissions by displacing diesel-fired power generation at small rice mills through dissemination of low-cost and easy-to-operate stirling engines that use biomass as fuel in Cambodia, where rice mills largely depend on captive power generation using diesel fuel due to limited development of grid electricity.
<b>GHG emissions reduction</b>	17.52 tCO <sub>2</sub> /year
<b>Sustainable development in host country</b>	The project will contribute to climate change mitigation by reducing GHG emissions through displacing fossil fuel with biomass fuel for power generation. At the same time, the project is in line with Cambodia's energy policy as it supports low-cost energy development and rural electrification, therefore contributing to the sustainable development of Cambodia.

Source: Global Environment Centre Foundation (GEC) (2013), "Reports of JCM/BOCM Feasibility Studies: FY2012" , [http://gec.jp/main.nsf/en/Activities-Climate\\_Change\\_Mitigation-FS2012jcmfs01](http://gec.jp/main.nsf/en/Activities-Climate_Change_Mitigation-FS2012jcmfs01)

### b) "Centralization of heat supply system by installation of high efficiency heat only boiler (HOB)"

<b>Project site</b>	Ulaanbaatar City, Bornuur Soum
<b>FY</b>	2013
<b>Category of Project</b>	Energy saving
<b>Main implementing entity</b>	Suuri-Keikaku Co., Ltd.
<b>FS Partners</b>	Anu-Service
<b>Description of project</b>	The project in Bornuur Soum comprises the installation of Heat Only Boilers (HOBs) as well as pipe laying work, the electrical construction and boiler building construction. The project at the 118 <sup>th</sup> School in Ulaanbaatar consists in the expansion of the HOBs capacity.
<b>GHG emissions reduction</b>	- Bornuur Soum project: 364 tCO <sub>2</sub> /year - 118 <sup>th</sup> School project: 168 tCO <sub>2</sub> /year
<b>Sustainable development in host country</b>	Coal consumption will be reduced in Ulaanbaatar City and rural cities of Mongolia which will be linked to the improvement of air pollution in Mongolia and can prolong the life of coal deposits.

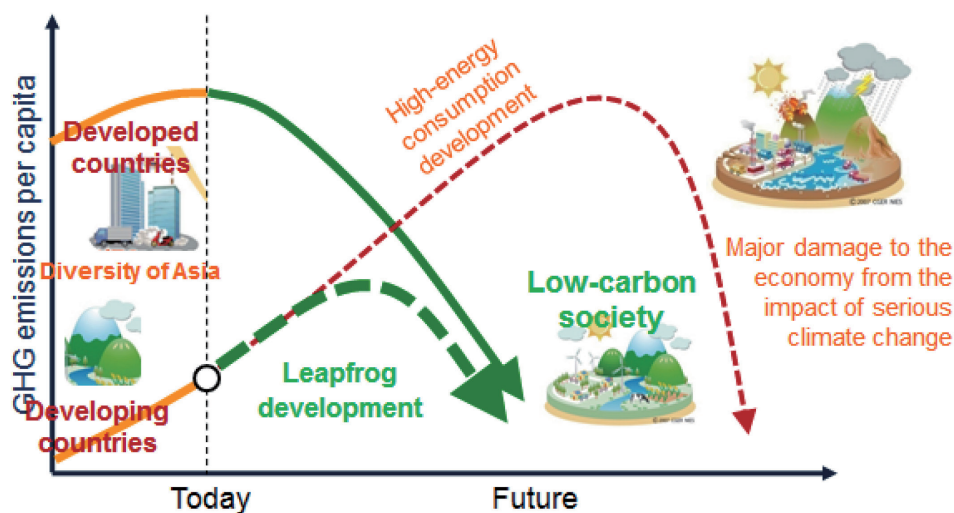
Source: Global Environment Centre Foundation (GEC) (2013), "Reports of MOEJ/GEC JCM Methodology Demonstration Study: FY2013" (Study Report), [http://gec.jp/main.nsf/en/Activities-Climate\\_Change\\_Mitigation-jcm2013ds02](http://gec.jp/main.nsf/en/Activities-Climate_Change_Mitigation-jcm2013ds02)

Additionally, in April 2014, a fund to support a "leapfrog" type of development has been established. "Leapfrog" development is defined as a "simultaneous achievement of a low-carbon, resource recycling,



and naturally-symbiotic society while also improving lifestyle levels through economic development, without following the development trajectory of developed countries in wasting energy and resources”<sup>2</sup>

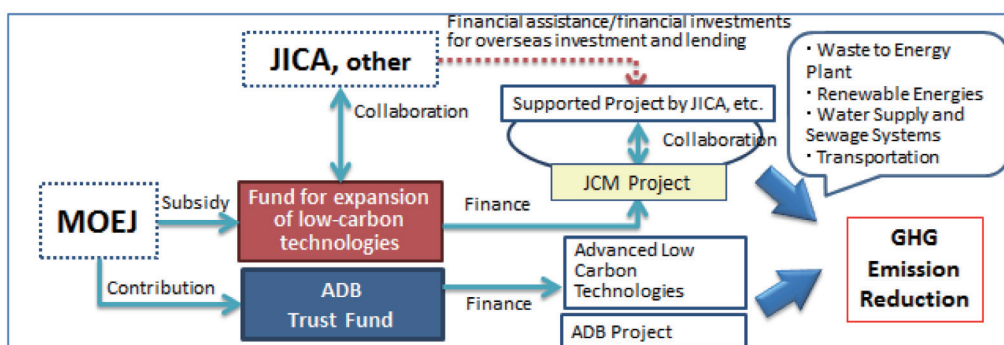
Figure 2: Concept of “leapfrog” type of development



This fund is composed of contributions from Japan International Cooperation Agency (JICA) and the Asian Development Bank (ADB). The cooperation fund with JICA is intended to finance projects that reduce GHG emissions in collaboration with other projects supported by JICA and other national organizations. The rationale for this fund is that through this finance scheme, the expansion of superior and advanced low-carbon technologies in Japan can be achieved based on the assumption that even if the initial costs for projects are high, its emission reduction effects are also high.

In parallel, MOEJ has concluded the signature of a memorandum of understanding with ADB in June 2014 to support “leapfrog” development projects. The rationale for this fund is that additional costs are reduced with the use of funds that are donated to the ADB trust fund, which allows use and introduction of advanced technologies that are not being used in ADB projects because of high introductory costs. Hence, it is believed that this scheme will lead to the targeted “leapfrog” development.

Figure 3: Illustration of funds to support “leapfrog” type of development



Source: New Mechanisms Information Platform:  
([http://www.mmechanisms.org/document/20141014\\_JCM\\_goj.pdf](http://www.mmechanisms.org/document/20141014_JCM_goj.pdf))

<sup>2</sup> Source: <http://2050.nies.go.jp/index.html>



JCM is also conducted by the Ministry of Economy, Trade and Industry (METI) and implemented by the New Energy and Industrial Technology Development Organization (NEDO), which is similar to MOEJ's schemes. The JCM Promotion Scheme by METI is described in the table below:

**Table 2: JCM Promotion Scheme by METI**

Type of Project	Contents
1.JCM Feasibility Studies (FS)	To survey the feasibility of potential JCM projects
2.Capacity Building Programmes	Variety of capacity building activities to increase technical experts
3.JCM Demonstration Projects	Implemented by NEDO, supports the project costs necessary to verify the amount of GHG emissions reduction

Source: New Mechanisms Information Platform. (<http://www.mmechanisms.org/e/initiatives/jcm.html>)

## Role of mitigation actions in a post-2020 regime from the perspective of market mechanisms

### Relation between JCM and NAMAs

JCM projects have many characteristics that resemble what is known as NAMAs, as it is explained below. Nevertheless, it would be more appropriate to say that JCM is a mechanism that promotes the implementation of “mitigation actions”.

The fact that JCM can start only when a national government of a developing country signs the corresponding bilateral agreement with Japan, confirms the level of compromise and facilitates consensus-making through the formation of a “Joint Committee”, which is the place where all considerations about projects, participants, etc. are decided.

Also, JCM projects are supposed to play a leading role among nationally prioritized strategies and plans taking into account the potential for GHG emission reductions. Hence, these mitigation actions meet the criteria of being “nationally appropriate”.

Some JCM signatory countries such as Vietnam, Cambodia and Mongolia have officially stated their intention to conduct JCM projects through NAMAs. In the case of Mongolia, they have confirmed through official submissions to the UNFCCC, their intention to conduct NAMAs, in line with their national and sectoral plans in the following sectors: Energy supply (increase renewable options, improve coal quality, improve efficiency of heating boilers, improve household stoves and furnaces, improve Combined Heat Power (CHP) plants, increase use of electricity for local heating in cities); building (increase building energy efficiency), industry (increase energy efficiency in industry), transport (use more fuel-efficient vehicles), agriculture (limit quantity & increase quality of livestock), and forestry (improve forest management, reduce emissions from deforestation and forest degradation).

One concrete example is their National Energy Efficient Lighting Program, which is currently looking for support through the NAMA Registry.

Specific measures to be conducted through NAMAs have already been studied for the implementation of JCM, as for example a project study for solar power generation (10MW-scale Solar Power Plant and Rooftop Solar Power Generation System) or a feasibility study for combined heat and power plants (Improvement of Thermal Insulation and Water Cleaning/Air Purge at Power Plant); which aims at reducing 16,500tCO<sub>2</sub>/yr and 3,000tCO<sub>2</sub>/yr of emissions, respectively.

In summary, JCM projects offer one concrete alternative to conduct mitigation actions through the introduction of leading low carbon technologies in order to efficiently achieve GHG emissions reductions. This cannot be achieved without support. Specifically, JCM provides support in the form of technology, finance and capacity building, which are also the key support components of a NAMA.

## Conclusions

The beauty of mitigation actions lies in its flexibility. The possibilities to combine different participants and contributions in a single project give ample space for innovativeness. One of this Guidebook's objective is to provide the necessary elements for practitioners to propose innovative ideas in order to plan and implement mitigation actions.

Although JCM has not been created to specifically implement NAMAs, both JCM and NAMAs aim at achieving substantial emissions reductions through the implementation of projects in host countries. As explained before, some JCM signatory countries such as Cambodia, Mongolia and Vietnam have officially stated that they intend to conduct JCM projects through NAMAs<sup>3</sup>.

Finally, mitigation actions in general which includes NAMAs and JCM projects, cannot be ignored at the time discussions are focused on the post-2020 agreement and how countries can raise their level of ambition. The authors believe that new mechanisms such as JCM widen the opportunity to conduct mitigation actions, under the condition that both, support-providers and support-recipients report in detail and in a transparent way through the proper channels.

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## 4.2 The Climate Technology Centre and Network (CTCN) and NAMAs

By | Takahiro Murayama, Global Environment Centre Foundation (GEC)

### Background

The Climate Technology Centre and Network (CTCN) – the operational arm of the UNFCCC Technology Mechanism – is one of various schemes which contribute to developing countries in preparing, elaborating, and implementing their NAMAs with regard to climate change technology development and transfer. The CTCN does not provide funding directly to developing countries, but rather aims to support the development and transfer of mitigation and adaptation technologies in developing countries through expert technical assistance (CTCN 2014a). Developing countries could make requests through their National Designated Entities (NDEs) to the Climate Technology Centre (CTC), and responses to those requests would be categorised into a “quick response” (less than USD50,000) or a “response project” (up to about USD250,000) depending on a scale and a scope of each request. The quick response would be provided by the CTC together with its 13 Consortium Partners from all over the world while the response project would be delivered by organisations from the Climate Technology Network (CTN) with supervision of the CTC. There are 17 organisations registered as the CTN members which have various expertise and experiences in climate change mitigation and adaptation, including Global Environment Centre Foundation (GEC) and Overseas Environmental Cooperation Center (OECC), from Japan as of September 2014 (CTCN 2014b). The CTCN started to receive requests for technical assistance since early 2014; and so far, there have been 23 requests at different stages with regard to their progress (two started implementation, 12 formally submitted and under the process of elaboration by the CTC, and nine informally discussed between the CTC and the developing country NDEs; CTCN 2014c).

### Linkages between the CTCN and NAMAs

Some noticeable linkages between the CTCN and NAMAs could be found in official documents of the CTCN, an analysis, and examples of the technical assistance requests. The prioritization criteria of the CTCN (2013) for responding to requests from developing countries indicates that the Director of the CTCN shall ensure that all requests for assistance approved by the CTCN demonstrate that the support provided will contribute to increased resilience and /or mitigate emissions, and is aligned with national plans. The CTCN operating manual for NDEs (CTCN 2014d) also suggests that the NDEs shall coordinate with other national focal points of UNFCCC Mechanisms including National Focal Points for NAMAs, to enhance effectiveness and scope of the CTCN interventions and leverage international funding for adaptation and mitigation activities. Consideration of these other national planning processes will help ensure that the request is in line with national development and climate strategies. The Technology Executive Committee (TEC 2013) identified linkages between Technology Needs Assessment (TNA) and NAMAs by examining main steps within the processes of the TNA and NAMAs. Given the NAMA’ s steps identified, the technical assistance delivered by the CTCN could contribute to some of these steps, in particular “NAMA policies and actions” and “NAMA implementation” . The linkage is obvious as the CTCN technical assistance was originally designed to support implementation of mitigation and adaptation projects regarding technology. The CTCN could also promote development of NAMAs by reception of support to conduct TNAs, or by “technical support for policy and planning documents” and “training” under technical assistance – although it should be emphasised that the

primary objective of the technical assistance is to support implementation of tangible technology transfer projects.

As some of examples for the CTCN' s contributions to NAMAs' processes, there are three NAMA-related technical assistance requests from the developing country NDEs, namely "Development of a Mechanical-Biological Treatment (MBT) pilot project of the Waste NAMA" by Colombia, "Green Cooling Africa Initiative (GCAI)" jointly proposed by Ghana, Kenya, Mauritius and Namibia, and "General question about getting support preparation of NAMA to reduce greenhouse gases emissions" by Syria (CTCN 2014a, CTCN 2014c).

## The Way Forward

Since the establishment of the CTCN, indicators such as the number of requests, the developing country NDEs and CTN organisations have been rapidly growing, and therefore the technical assistance projects which support NAMAs under the CTCN are expected to increase significantly in the near future. Meanwhile, the linkages between NAMAs and the CTCN might not have been fully recognised among developing countries yet. Given this situation, broader and deeper recognition of such linkages should be raised by the CTC and the CTN organisations, and also by the developing country NDEs for their domestic stakeholders who should be aware of the opportunities for the assistance. With such awareness being raised, the synergies between NAMAs and the CTCN would be enhanced to effectively deliver technology development and transfer to developing countries, and ultimately concrete mitigation outcomes would be achieved.

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## 5 NAMAs and BUR

By Takako Ono, Institute for Global Environmental Strategies (IGES)  
Makoto Kato, Overseas Environmental Cooperation Center, Japan (OECC)

### Background

Mitigation efforts as NAMAs are actions pledged by developing countries to the UNFCCC, and they are subject to a transparency measure by definition. While there are various approaches and definition of measurement, report, and verification (MRV), according to different levels of actions to check the progress made, overall and aggregated results are provided in biennial update reports (BURs) and used for the MRV process under the UNFCCC.

### Relationship between NAMAs and MRVs

Non-Annex I Parties under the UNFCCC need to provide information on the progress of implementation of nationally appropriate mitigation actions (NAMAs) as a part of their BURs once every two years according to the UNFCCC guidelines for the preparation of the BURs in Annex III in Decision 2/CP.17 in a measurable, reportable and verifiable manner. BURs are reports which non-Annex I Parties need to submit to the Conference of the Parties (COP) under the UNFCCC once every two years to provide information on GHG emissions/removals, status of implementation of mitigation and adaptation measures and capacity building needs.

### Contents of Biennial Update Reports (BURs)

BURs are a new requirement under the UNFCCC, which are supplements of national communications (NCs). Non-Annex I Parties have submitted their NCs on an ad-hoc basis. However, the COP17 decided to require non-Annex I Parties to submit BURs once every two years in order to enhance provision of information relevant to coping with climate change. The main contents of BURs are as follows:

- a. National circumstances and institutional arrangements;
- b. National greenhouse gas inventory;
- c. Mitigation actions and their effects;
- d. Constraints and gaps, and related financial technical and capacity needs;
- e. Level of support received for preparation of BURs;
- f. Domestic measurement, reporting and verification,
- g. Any other information.

Among the items above, non-Annex I Parties need to provide information on their NAMAs in the item c. (mitigation actions and their effects).

### MRV on NAMAs in BURs

With respect to measurement and reporting of NAMAs, non-Annex I Parties need to report the following

information<sup>1</sup> in their BURs:

- a. Names and description of the NAMAs, including information on the nature of the NAMAs, coverage (i.e. sectors and gases), quantitative goals and progress indicators;
- b. Information on methodologies and assumptions;
- c. Objectives of the NAMAs, and steps taken or envisaged to achieve the NAMAs;
- d. Information on the progress of implementation of the NAMAs and the underlying steps taken or envisaged, and the results achieved, such as estimated outcomes (merits depending on types of NAMAs) and estimated emission reduction, to the greatest extent possible;
- e. Information on international market mechanisms.

With respect to verification, there is no official international verification and review process for BURs. Instead, international consultation and analysis (ICA) is implemented to the BURs. ICA consists of technical analysis by technical team of experts (TTEs) and facilitative sharing of views under the Subsidiary Body of Implementation (SBI) under the COP. In other words, ICA is to facilitate developing countries to take stock of their current situation and progress made, as well as clarifying challenges to go way forward, which are useful for their own efforts further as well as international cooperation and support. During the technical analysis, BURs are analyzed by a TTE in a manner that is non-instructive, non-punitive and respectful of national sovereignty. The TTE is composed of experts nominated to the UNFCCC roster of experts who have completed a training program by the UNFCCC. After the technical analysis, a facilitative sharing of views, which is a workshop under the SBI, is implemented to BURs. The facilitative sharing of views is implemented as a 1-3 hour session for each Party which consists of a brief presentation by the Party on its BUR, following by oral questions and answers.

## Support for Preparation of BURs

Financial and technical supports are provided for preparation of BURs. With respect to the financial support, Global Environmental Facility (GEF) provides the financial support to non-Annex I Parties preparing their BURs on the basis of agreed full cost funding. In addition, most of the technical supports that are available for NCs are also available for BURs because reporting elements of NCs and BURs overlap.

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## 6 INDCs and contribution toward country's ambition

By Emiko Matsuda, Overseas Environmental Cooperation Center, Japan (OECC)

## Background

In November 2013 at the 19<sup>th</sup> Conference of the Parties (COP) in Warsaw, Parties to the UNFCCC

<sup>1</sup> While mitigation actions may be designed and implemented according to respective developing countries, to design such actions as NAMAs, these items are useful references. For example, in preparation process, practitioners may consider quantitative goals and progress indicators, as a package of plan of mitigation actions or activities.



were invited to “...initiate or intensify domestic preparations for their intended nationally determined contributions (INDC), without prejudice to the legal nature of the contributions, in the context adopting protocol, another legal instrument or an agreed outcome with legal force under the convention applicable to all parties toward achieving the objective of the convention as set out in its article 2 and to communicate them well in advance of the twenty-first session of the conference of the Parties (by the first quarter of 2015 by those parties ready to do so) in a manner that facilitates the clarity, transparency and understanding of the intended contributions, without prejudice to the legal nature of the contributions...” (1/CP. 19)

In the COP20 held in Lima, negotiations focused on the outcomes to advance towards reaching an agreement at the COP 21 in Paris in 2015, including elaboration of the required information in order to facilitate clarity, transparency and understanding among parties (1/CP.20, Table 1), and expedite the required submission of INDCs as early as possible during 2015.

Consequently the ‘Lima Call for Climate Action’, aiming at advancing the 2015 agreement, was adopted, and since then (even before, in some cases), preparation for INDCs has been started by Parties.

**Table 1: List of information to be included in INDCs (1/CP.20)**

- |  |
|--|
| <ul style="list-style-type: none"> <li>• Reference point (including, as appropriate, base year)</li> <li>• Time frame</li> <li>• Period for implementation</li> <li>• Scope and coverage</li> <li>• Planning processes</li> <li>• Assumption</li> <li>• Methodological approaches including estimating and accounting GHG emission</li> <li>• Removal</li> <li>• Ambition</li> </ul> |
|--|

## Conversion from the existing efforts to INDCs

In order to prepare for INDCs in each country, the United Nations Development Program (UNDP) in cooperation with the UNFCCC Secretariat launched a series of Regional Technical Dialogues to support countries in the process of preparing and putting forward their INDCs prior to the COP21. A total of 231 participants gathered for the Regional Dialogues held in Colombia, Ghana and Vietnam<sup>1</sup>. In addition, the 23<sup>rd</sup> Asia-Pacific Seminar on Climate Change (AP-Net) was held in Kanazawa, Japan, hosted by the Ministry of the Environment, Japan (MOEJ), under the title of “Technical Dialogue: Sharing the knowledge of, experience in, and lesson learned from mitigation and relevant strategies/ program/ activities, taking into account the 2015 agreement” , in order to discuss mitigation activities as well as INDCs.

According to the reports from these Regional/Technical Dialogues, government representatives from the South American, African, Eastern European and Asia Pacific regions, as well as representatives from research institutions and aid agencies have participated. Some of these participants made presentations and conducted discussions in relation to INDC preparation. Some comments and opinions that have been reported can be summarized in the following list:

- Recognize the importance of high-level political commitment to take action;

<sup>1</sup> Source: International Partnership on Mitigation and MRV (<http://mitigationpartnership.net/>)

- Include stakeholders from the outset of the process in order to build trust and help generate consensus around actions;
- When preparing INDCs, a country should begin with an analysis of its emission profile by looking at its national GHG emission inventory;
- INDCs may be seen as a stepping-stone toward concrete, transformational actions. In this context, alignment between INDCs and on-going initiatives, such as low emission development strategies (LEDS), Nationally Appropriate Mitigation Actions (NAMAs), National Communications (NCs), Biennial Update Reports (BURs), Technology Needs Assessments (TNAs), Climate Technology Centre and Network (CTCN) and also adaptation activities such as National Adaptation Programme of Action (NAPA) and National Adaptation Plan (NAP) would help countries build on relevant initiatives and strengthen the transformational potential of INDCs;
- It is important for countries to have an overall strategy to coordinate their national climate change policies;
- To link INDCs with the sustainable development and economy growth;
- Need to analyze how to reflect adaption, forest, and agriculture into the international agreement; and
- The process of developing INDCs can provide a good opportunity to review the development strategy of each country.

From those opinions, it is clear that participants have realized that existing activities constitute the starting point for INDCs preparation, and they have also recognized that there is a linkage with their current efforts such as preparation of NCs. It has been inferred that NAMAs themselves can have a direct link with INDCs if aggregated NAMAs are taken as the starting point to define a country's INDCs, or if INDCs are considered as actions rather than outcomes (i.e. targets) then NAMAs themselves can be taken as a major part of INDCs. Most importantly, NAMAs have significance in the sense that they act as vehicles to channel finance for the implementation of the INDCs. In this context, it is worth pointing out that due to its relevance, NAMAs are likely to continue beyond 2020 although 2020 is the original timeframe given to NAMAs.

Participants also concluded that a high-level stakeholder engagement and a champion local government are critical for INDCs development and further preparation. They have highlighted the importance of an increase of awareness among stakeholders, in order to realize how the process of developing their contributions could help catalyze low carbon economies and poverty eradication.

## Key challenges and support needs

In their contributions, countries need to make sure that preparation of INDCs is based on robust data and its subsequent analysis, meaning each country may have difficulties in seeking technical information from inventories, projections, mitigation actions, cost analyses and so forth. Therefore, an in-depth investigation and a consultation process become necessary before submissions. In sum, it is important to realize that accurate reporting will increase the transparency of information and the reliability of INDCs. National circumstances are diverse. There are differences in the initial situation, development stages, degrees of urbanization, industrial development stages, degrees of technological maturity, degrees of market development, domestic finance capacities, and so forth. In addition, GHG inventories or baseline emissions are identified in major sectors such as the energy sector, but countries may need to develop baselines for other sectors as well. Considering that INDCs have been introduced recently, countries, and in particular those from least developed countries (LDCs) and small island developing states (SIDS),

may have limited technology and human resources. Hence, they may face additional challenges to prepare their INDCs.

## Support for INDC preparations

Countries have been asked to submit INDCs before December 2015 at the latest, which is why COP19 has decided to request and urge developed country parties, operating entities of the financial mechanism, and any other organizations in a position to provide support, to do so as early as possible and before December 2015.

Given that the concept of INDCs is relatively new, countries had limited time to build a new support program. But a number of support activities, not necessarily referred as INDC support, can also be utilized for the preparation of INDCs. Those countries having some difficulties in providing baseline modeling for example, can find some financial support to generate the required information. For example, the Global Environmental Facility (GEF) can provide support through UN agencies to conduct national consultations, baseline studies, and inventory preparation. Germany has also been providing support to South American and African countries and others through baseline studies and evaluation of mitigation potential. EU has supported SIDS, LDCs and Latin American countries to provide financial and technical support for inventory preparation, baseline studies and economic and GHG emission models. Japan mostly supports Asian countries through workshops on INDCs and NAMA, and inventory preparation. Such information has been reported on the Report on Sources of Support for the Preparation of Intended Nationally Determined Contributions (2014).

## Ambition for the 2 degrees target

Although IPCC AR5 reported that we have to follow the most stringent scenario (the representative Concentration Pathway 2.6: RCP2.6) in order to keep atmospheric temperature increase below 2 (or 1.5) degrees compared with pre-industrial levels, the WMO's Annual Compendium on the Status of the Global Climate and other reports (Will Steffen et al.) indicates that we shall make a great effort to prevent global warming immediately. Regarding this, a frequent question raised at regional workshops referred to "how to ensure that these efforts will add up to the 2 degree target?" Since the concept of INDC is based on a bottom-up approach, it will be impossible to answer this question accurately unless all of INDCs from each country are completed and submitted. In that sense, a country's contribution is totally based on its ambition toward climate change action: In other words, to what extent a country is affected by climate change; in what proportion a country should take responsibility against climate change issues affecting the entire planet, etc. In order to determine to what extent a country's ambition will meet the 2 degrees goal, the focus should be for countries to fully engage in this effort and accomplish the preparation of INDCs as accurate as possible while ensuring transparency. The purpose of INDCs is to have a clear, transparent and in-depth information on for example, mitigation actions, that in view of what has explained above can definitely prove if each country's efforts are sufficient or not, or if more support is necessary and in which form. We could also say that INDCs could be the starting point of a process to increase ambition from countries over time.

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## Section II: Case Studies

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### Introduction to the case studies

The first edition of the NAMA Guidebook dedicated more than half of its contents to discuss theoretical and policy issues related to NAMAs. In the second part, 4 NAMA case studies conducted in Asia and 3 projects introduced in Mexico were introduced. However, it is fair to say that finding examples of NAMAs, especially at the implementation stage, is not an easy task.

Despite the significant role that NAMAs were meant to play in the reduction of GHG emissions in developing countries, it is believed that only few projects managed to find international support. Just by looking the NAMA Registry hosted by the UNFCCC, which is a voluntary database inadequately updated by governments, it is easy to understand the reluctance from financers to support NAMAs.

In spite of this scenario, some NAMAs were developed in the last year, and people involved are eager to share their experiences. This section introduces 8 case studies aiming at showcasing challenges, difficulties, lessons learned and new topics of discussion that we hope it can be shared between practitioners to start new initiatives.

# Introduction to the case studies

1

## Nationally Appropriate Mitigation Action (NAMA) to accelerate geothermal power: Lessons from Kenya

By

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*This case study first appeared as a CDKN Inside Story on Climate Compatible Development, by Falzon et. Al., funded and published by CDKN, December 2014.<sup>1</sup>*

### Key messages

- Kenya has high ambitions for geothermal power, and has defined a Nationally Appropriate Mitigation Action (NAMA) to expand the role of the private sector to accelerate its development.
- The NAMA is an important step in making the National Climate Change Action Plan (NCCAP) a reality on the ground.
- A sub-component of the NAMA was submitted to the NAMA Facility in July 2014, seeking funding to begin implementation.
- The development process had to overcome challenges, including raising awareness and obtaining buy-in of key stakeholders, securing financial partners, documenting and communicating the NAMA, and dealing with questions about 'additionality'.
- Some of the lessons learned include the need for targeted, tailored communication on NAMA's potential added value and linking the scope of the NAMA with the intended transformation of the entire sector.

### Introduction

The Government of Kenya has ambitions to significantly expand its power supply from geothermal sources to underpin low-carbon, climate-resilient development, as encapsulated in its National Climate Change Action Plan (NCCAP). Although progress has been made, greater private sector involvement is needed to keep the goal within reach. Kenya has developed a Nationally Appropriate Mitigation Action (NAMA) to mobilise private investment, through channelling targeted international climate finance and technical support. After introducing the context and objectives of Kenya's geothermal NAMA, this brief focuses on the challenges faced in the process of developing the NAMA, and highlights lessons learned and recommendations for future NAMA development, both in Kenya and globally.

Geothermal power plants, which convert steam generated from hot rocks deep underground into electricity, have a prominent place in Kenya's overarching development plans. These include the Vision 2030, the NCCAP, and the current '5000+ MW in 40 months initiative'. Geothermal power has the potential to provide reliable, cost-competitive, base-load power with a small carbon footprint, and reduces vulnerability to climate change<sup>2</sup> by diversifying power supply away from hydropower, which currently provides the majority of Kenya's electricity.

Kenya has set out ambitious targets for geothermal energy. It aims to expand its geothermal power production capacity to 5,000 MW by 2030 (NCCAP, 2014), with a medium-term target of installing

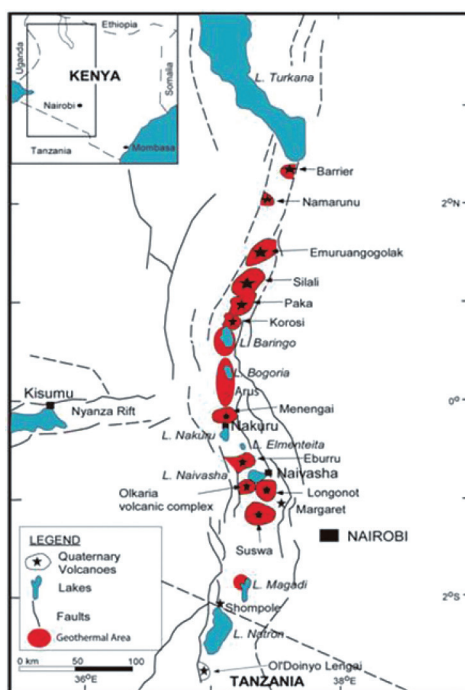
<sup>1</sup> Source: <http://cdkn.org/resource/nama-geothermal-power-lessons-kenya/>

<sup>2</sup> Rainfall has been extremely erratic in Kenya during the past three decades and climate change is locked in until the middle of the century, which threatens to expose Kenya's power generation assets to further changes in heat and rainfall (IPCC, 2007).



1,887 MW by 2017 (MoEP, 2014). As of October 2014, Kenya has an installed geothermal capacity of approximately 340 MW. Although there is significant political will and ambition, reaching these ambitions is a major challenge.

Figure 1: Geothermal Sites in Kenya (MoEP, 2014)



## Limited public funds and developers

Kenya's geothermal development stands at a critical juncture, requiring large and rapid investments if it is to meet its goals. New construction in the sector has largely been financed from the domestic budget and international concessional finance through the partially state-owned developer KenGen and the fully state-owned Geothermal Development Company (GDC). These public sources of national and international finance are limited and are a bottleneck to growth. There is also a long lead-time for bringing additional capacity online as KenGen and GDC can only develop a limited number of fields at a time.

## The need to scale-up private sector participation

Attracting private actors to co-invest in the sector will be critical to achieving the targeted growth. It is estimated that the private sector will need to cover approximately 40–50% of the US\$20 bn required to reach the 5,000 MW goal for geothermal, compared with the historical 10–15% level of private investment.<sup>3</sup>

The Kenyan Government has taken a variety of steps and measures to attract greater private investment in its geothermal sector. The main initiative was the establishment of the GDC to undertake

<sup>3</sup> NAMA for accelerated geothermal development in Kenya - Proposal (2014). Available at [www.mitigationmomentum.org](http://www.mitigationmomentum.org)

geothermal well explorations and drilling for independent power producers. However, these steps have not yet achieved the necessary levels of private sector participation.

## The Kenyan Government takes action

The term NAMA was first coined at the United Nations Framework Convention on Climate Change (UNFCCC) meeting in Bali in 2007, as part of the Bali Road Map. A voluntary measure, it refers to policies and actions that countries undertake to mitigate greenhouse gas emissions. By packaging actions as NAMAs, developing country governments can potentially receive international financial and technical support.

Recognising this opportunity, the Government of Kenya decided to accelerate geothermal expansion by designing a NAMA. The NAMA aims to achieve two key outcomes: first, enhancing the opportunity for investment through an improved risk-return ratio; and second, aiding and developing local human capacity along the supply chain to manage significant expansion of the sub-sector.<sup>4</sup> The NAMA should directly support 820 MW of additional capacity by 2020, resulting in 3.77 million tonnes of CO<sub>2</sub> equivalent (MtCO<sub>2</sub>e) per year emissions reductions by 2020.

## NAMA development process

The decision to pursue a NAMA was first taken by the Ministry of Environment, Water and Natural Resources (MEWNR)<sup>5</sup> in the second half of 2012. The government has identified the potential of this instrument as a key delivery mechanism for the NCCAP 2013–2017. To develop the NAMA, the government sought technical support from the Mitigation Momentum project and CDKN.<sup>6</sup> The Energy Research Centre of the Netherlands (ECN) provided technical support – its previous involvement in the NCCAP process facilitated a strong link between the NAMA and the NCCAP processes.

The NAMA was developed step-wise with multiple iterations, involving many different stakeholders. Approvals were required by different actors at various stages along the process (outlined in Table 1).

**Table 1: Outline of process to develop geothermal NAMA.**

<b>NCCAP process 2011–2013</b>	NCCAP for 2013–2017 developed, with corresponding priority areas.
<b>Project inception August 2012</b>	Mitigation Momentum project requested to provide support to Government of Kenya to bring forward an element of the NCCAP as a NAMA. Roles and responsibilities defined, and a work plan for delivery of the NAMA agreed. The MoEP was defined as the lead line ministry, MEWNR as coordinating ministry, and ECN as technical support to the MoEP.
<b>Scope selection September 2012</b>	The concerned ministries and project team met and decided to develop a NAMA targeting accelerated geothermal. The basis for the decision was that accelerated geothermal was the priority action with the highest mitigation potential in the energy sector, as well as being the highest of the six priority actions identified by the MoEP for the short and medium term.
<b>1st stakeholder workshop February 2013</b>	Kick-off workshop organised by MEWNR and MoEP, involving Ministry officials, the energy regulator, geothermal development companies, civil society, and the private sector.

<sup>4</sup> For a detailed description of the NAMA, see the [www.mitigationmomentum.org](http://www.mitigationmomentum.org) website.

<sup>5</sup> Then the Ministry of Environment and Mineral Resources (MEMR).

<sup>6</sup> Funded by Germany (Mitigation Momentum), the United Kingdom and the Netherlands (CDKN). For details, see <http://www.mitigationmomentum.org/project.html>

Background study March–July 2013	40–50 page comprehensive background study produced by project team to analyse barriers to geothermal development.
2nd stakeholder workshop August 2013	Presentation of background study to stakeholder group, discussion of barriers, prioritisation of key areas to focus on.
Concept note August–October 2013	20–30 page concept note for NAMA developed, covering rationale, actors, scope, instruments and Measurement Reporting and Verification (MRV) system.
3rd stakeholder workshop October 2013	Validation workshop for NAMA concept
Concept approvals October 2013	NAMA concept presented to MoEP and MEWNR for approval.
Proposal finalisation November–December 2013	Concept developed into concrete proposal (further detail on instruments, fields to be targeted, etc.)
NAMA submitted to UNFCCC Registry December 2013	MEWNR submits geothermal NAMA to UNFCCC NAMA registry (the first submission from Kenya)
NAMA Facility application preparation March–May 2014	CDKN provides support to bring geothermal NAMA to UK / German NAMA Facility. ECN provided support to MoEP / MEWNR to translate sub-component of NAMA programme into standalone NAMA Facility programme
Approvals for NAMA Facility application June 2014	Series of approval meetings held with MoEP, MEWNR, KenGen and GDC, at Permanent Secretary / Managing Director levels. Sign-off on NAMA obtained
Validation workshop NAMA Facility June 2014	Wider stakeholder group invited to comment upon and validate NAMA Facility application
NAMA Facility submission July 2014	NAMA Facility application submitted by Kenyan government

Green indicates key decisions and approvals, blue indicates stakeholder engagement, and pink illustrates activities, outputs and other important milestones. The UNFCCC NAMA Registry is a publicly available online platform operated by the UNFCCC Secretariat. Its purpose is to increase opportunities for implementation of and recognition for Nationally Appropriate Mitigation Actions (NAMAs) in developing countries (UNFCCC, 2014). The NAMA Facility is a joint programme for funding NAMAs of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the UK Department of Energy and Climate Change (DECC).

## Challenges faced and lessons learned in the geothermal NAMA development process

The geothermal NAMA was the first NAMA to be developed in Kenya. With little global experience that could guide the process, the development of the NAMA was a learning experience for all involved, and has valuable lessons for other countries that are embarking on NAMA development. In this section, we highlight some of the major challenges faced, and lessons learned for future NAMA development.

*CHALLENGE: Creating institutional and key stakeholder awareness of NAMAs and obtaining meaningful buy-in*

For many stakeholders involved in the development of the NAMA, the NAMA concept was generally unheard of. Some technical staff in the line ministries were already aware of NAMAs; however, the key decision-makers, such as the principal secretary,<sup>7</sup> needed to understand the potential value of the instrument before giving approval to move forward. In the case of geothermal power, it was also

<sup>7</sup> Formerly the permanent secretary.

necessary to obtain support from KenGen and GDC. In addition, buy-in from existing development cooperation partners was required to achieve a workable NAMA programme, complementary to their own efforts. The diverse decision-makers and stakeholders meant that it was important to clearly outline the specific benefits and potential trade-offs for each from the outset. However, due to the abstract nature of NAMAs, this was difficult early in the process, and the two main stakeholders, KenGen and GDC, were initially sceptical that the benefits of NAMA outweighed the potential costs in terms of their time investment.

*IMPLICATIONS: Targeted and tailored communication is needed about the potential value added by a NAMA, and transparency on the associated costs to the stakeholders is necessary*

For the geothermal NAMA, significant effort was expended on creating awareness of the NAMA concept through briefings, stakeholder workshops and bilateral meetings. An important success factor was tailoring the level of detail for different stakeholders, and articulating the potential benefits of the NAMA for the specific actor. To ensure meaningful buy-in, formal approval through official letters from the relevant decision-maker were sought at important stages of the process. In many cases support was obtained from key stakeholders when the project team was able to identify a key bottleneck and propose a viable solution that was not being brought forward by another actor. With competing demands on stakeholders' time and resources, the demonstration of the potential added value of the NAMA is a critical success factor.

*CHALLENGE: Bringing on board financial partners to implement the supported NAMA*

Development finance institutions (DFIs) such as the African Development Bank (AfDB), The World Bank, KfW Development Bank (Germany) and the French Development Agency (AFD) are very active in Kenya's geothermal power development. With their robust processes and procedures built up over many decades in developing countries, DFIs made excellent candidates to manage the implementation of the internationally supported component of the NAMA (the NAMA Facility actually demands participation of such an institution). However, their strength is also a barrier, in that their processes and structure are not particularly flexible, nor adaptable to a new, innovative structure or programme in a short time. Thus, practical constraints prevented otherwise interested DFIs from committing to the supported component of the NAMA. In the case of the Kenya geothermal NAMA, some DFIs had limited capacity to manage an additional programme, there were also concerns over sources of funds and associated legal conditions, risk exposure, bankability and profitability (managing grants is not a 'core business activity'), and obtaining approvals from the internal hierarchy.

*IMPLICATIONS: Going beyond consultations with financiers at an earlier stage*

In the Kenyan case, early discussions were limited to the provision of technical inputs: primarily understanding the ongoing activities of the DFI to create complementarity. As a result, the components of the NAMA seeking international support were designed in a manner that was incompatible with DFIs' internal funding streams, existing financial instruments and internal processes for engaging in an initiative. A potential opportunity may have been missed by not inviting DFIs to participate at an earlier stage in a more formal manner. A practical approach to not miss this opportunity in future would involve: gaining a deep understanding of the potential implementation partners and donors as early as possible; communicating that government has an intention to work collaboratively on defining the supported component of the NAMA programme (rather than merely asking for technical inputs); identifying mutually

interesting opportunities – either external (e.g. NAMA Facility) or internal (existing financial cooperation instruments); and formalising cooperation on the specific opportunity.

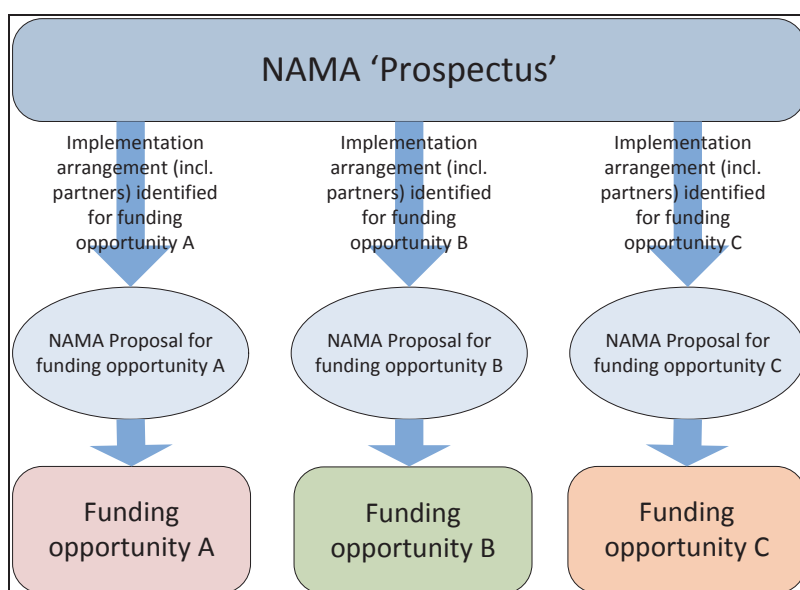
*CHALLENGE: How to document and communicate the NAMA*

In the original work plan, a key deliverable was the preparation of a concrete NAMA proposal to attract international support. The challenge faced was that without a definite financing opportunity in view, the instruments, activities and actors remained highly conjectural, since the process for arriving at an implementable supported NAMA is highly iterative between beneficiary (usually government) and donor. This meant that the resources invested in detailing a full NAMA proposal may have been prematurely mobilised.

*IMPLICATIONS: Framing of the NAMA and clearly defining the audience*

The proposal that was developed for the geothermal NAMA was repeatedly edited down or simplified on an ad-hoc basis, and actually resembled a higher level 'prospectus' or 'suite of options' that served as a basis for discussions with potential partners and donors. This was then turned into a firm proposal in response to a definite opportunity (the NAMA Facility). In future, this process could be formalised (see Figure 2), with the prospectus containing a suite of options that are being enacted (domestic element) and that could be enacted (with international support) to achieve the NAMA objectives, with sufficient detail to allow for discussions on modes of implementation (somewhere between a concept note and a full technical proposal). This would allow for a flexible approach, enabling the NAMA components seeking additional support to be packaged appropriately for specific funding opportunities, and an iterative process to occur (e.g. allowing space to adapt for development banks' internal requirements). It also has the added benefit of not making public specific information that, for several reasons, the beneficiary prefers remains confidential.

**Figure 2: NAMA 'prospectus' or 'suite of options' approach, which provides a basis upon which to identify and prepare specific proposals for different funding opportunities, for example the NAMA Facility, Green Climate Fund, or Development Finance Institution's internal funds.**



### *CHALLENGE: The additionality 'problem'*

When the NAMA process began, hundreds of millions of dollars were already being invested in Kenya's geothermal sector. This was to be expected, as the NAMA was intended to *accelerate* geothermal development. This made it difficult to articulate the added value that the NAMA would bring. The first problem was defining the scope of the NAMA and a 'business as usual' scenario so that the impacts of the NAMA could be assessed. Then there was a perception among some donors that there was no need for the additional support (as the sector already received substantial amounts from the donor community), and even if there was, the absorptive capacity of the government to manage another programme was already at its limits, as it was already pushing hard to develop geothermal.

*IMPLICATIONS: The scope of the NAMA needs to be linked with transformation of the sector, and the consequences of overcrowding in the sector need to be recognised and addressed rather than avoided*

A key quality criterion to attract funding is a clear link between the additional funds and mitigation impacts. This is not possible when dealing with a more nuanced, holistic approach to transforming the sector, and ultimately donors will need to accept some uncertainty in terms of the mitigation impact of their contribution. Nonetheless, by focusing on a clear definition of the 'transformation' that would accelerate the development of geothermal beyond business as usual levels, namely increased private sector participation, it was possible to identify specific indicators that could be used as proxies for estimating emissions reductions. That said, the robustness of this scope and acceptability to donors has yet to come under serious scrutiny.

Concerning the perceived over-crowding of the sector, a quick analysis and discussions with stakeholders indicated that the scale of the challenge is enormous, and that there remains a substantial financing gap. Nonetheless, the argument that the capacity of the government and stakeholders to absorb additional funds and another programme was based on reality – human resources are at their limits, and technical staff along the delivery chain overburdened. But, rather than seeing this as a reason for inaction, this overburdening was identified as another barrier that the NAMA could address to help improve sector development, and eventually became an integral part of the NAMA programme (support for technical staff). The management of the NAMA Facility programme application was also 'outsourced' to technical cooperation partners (GIZ and AfDB) to avoid further burdening of government and beneficiaries.

## **Remaining challenges and next steps**

The development of the NAMA is ongoing. The submission of a sub-component of the geothermal NAMA to a funding body (NAMA Facility) is seen as a first step of many by the government to take the NAMA forward. Major challenges remain before the NAMA fully matches the expectations of the government.

- Funding needs to flow in the short term – the government would like to see that the efforts in developing a NAMA bring tangible benefits.
- A robust MRV approach needs to be developed – the rather abstract scope (based on transformation of the sector) means that MRV becomes difficult. As NAMAs could be an important basis for Kenya's Intended Nationally Determined Contribution (INDC) (a key input to the negotiations leading to an agreement in Paris, 2015), it is important that a good understanding of how to identify, measure, report and verify the climate mitigation impact of the NAMA is determined.
- Institutional management and coordination of NAMA implementation needs to be clear. In the Kenya



case, institutional arrangements were clearly defined for the funding proposal to NAMA Facility (donors, ministries, agencies), but questions remain for the overall NAMA – who is to take it forward, to whom should progress be reported?

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Photos (royalty free)



Stakeholder workshop in Nairobi for NAMA preparation (taken by ECN)



Geothermal well testing (source: GDC)

## 2

## Institutional arrangements for mitigation actions in Lao PDR

By

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## Background

The Lao People's Democratic Republic (Lao PDR) is a landlocked country located in the Indochina peninsula. Blessed with abundant water of the Mekong River, hydroelectric power, agriculture and mining are the main industries. The country has continued to record a GDP growth rate of about 7% for the past decade, and consequently, the Lao PDR has become a 'lower-middle income economy' since 2011. In 2013, the Lao PDR's GNI per capita reached 1,460 USD. It is believed that if the country continues growing at this pace while human development improves as well, the Lao PDR will likely graduate from the category of 'Least Developed Country' by 2020. (Lao PDR overview, World Bank) While a promising future through economic growth is expected for the country, the poverty rate was still 23.2% in 2012, and 30% of the total population still had no electricity in 2010. (Lao PDR, the second

national communication, 2013). In terms of the impact of climate change, the Lao PDR remains highly vulnerable, and the country would probably be exposed to even higher climate risks in the future without the proper development of capacity to manage the current risks.

## Paving the way

The National Steering Committee on Climate Change Strategy was established in 2008. Chaired by the Deputy Prime Minister, the objective of the committee is to formulate strategies, programs and projects to handle climate change for the Lao PDR. This move represented the beginning of a critical policy process. Many partner organizations and countries such as UNDP, GEF and Japan have provided support in the form of funding and capacity-building activities, and due to these efforts, the country has been engaged in the introduction of measures to deal with climate change. In the next section, we would like to highlight efforts made for these institutional arrangements, and the importance of updating information on progress for the preparation of Nationally Appropriate Mitigation Actions (NAMAs) and Biennial Update Reports (BUR).

## Institutional arrangements in Lao PDR

Following the ratification of the Lao PDR in the United Framework Convention on Climate Change (UNFCCC) in 1995 and the Kyoto Protocol in 2003, the Climate Change Office (CCO) was established in 2007 under the Department of Environment, formerly the Water Resources and Environment Administration (WREA), which was responsible for all activities related to water, environmental management, and climate change. Since the Lao PDR has become aware of and has experienced the impacts of climate change resulting in severe floods and droughts, the CCO was upgraded and transformed into the Department of Disaster Management and Climate Change (DDMCC) in 2011, under the Ministry of Natural Resources and Environment (MoNRE).

Figure 1: Institutional arrangement for climate change action in the Lao PDR

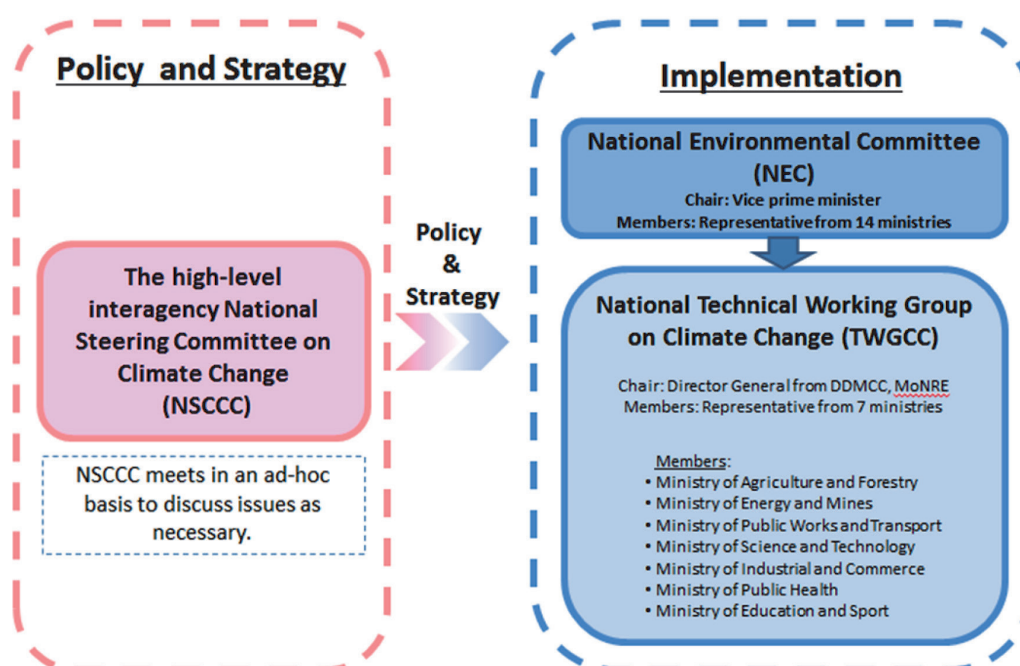


Table 1: Institutional Arrangement for Climate Change Action in Lao PDR.

- 2002 Establishment of National Environment Committee (NEC)
- 2007 Establishment of Climate Change Office (CCO)
- 2011 Establishment of Department Disaster Management and Climate Change (DDMCC)
- 2013 Establishment of Technical Working Group on Climate Change (TWGCC)

The high-level, inter-agency National Steering Committee on Climate Change (NSCCC), chaired by a Deputy Prime Minister and the Chairman of the National Environment Committee (NEC), has been providing insight and guidance for the formulation of climate change policies and programs in an ad-hoc manner, responding to urgent issues as necessary. Accordingly, the Technical Working Group on Climate Change (TWGCC), led by General Director of DDMCC (MoNRE), was established in 2013. This working group is composed by representatives from eight ministries as follows: Ministry of Natural Resources and Environment, Ministry of Agriculture and Forestry, Ministry of Energy and Mines, Ministry of Science and Technology, Ministry of Public Works and Transport, Ministry of Industry and Trade, Ministry of Public Health, and Ministry of Education and Sports. The assigned duties are to act as a Secretariat for the NSCCC, to assess the impacts of climate change and to outline priority actions for adaptation and mitigation measures. (Table 1, Figure 1)

The figure illustrates how the NSCCC, NEC and TWGCC give space for participation to key line ministries in order to facilitate consensus building and the decision-making process. It is in this committee where all decisions related to climate change and environmental issues are being discussed and decided. More specifically, decisions related to formulation and implementation of CDM, NAMAs, and JCM projects are taken in the TWGCC with overall supervision of the NEC.

It is believed that this institutional arrangement will facilitate interactions with external organizations such as donors, research institutions, etc. and at the same time, it will help organize the MRV process.

## Progress of mitigation actions and submission of BUR and NAMAs

Despite the fact that the Lao PDR is in the Non-annex I country category and consequently has a non-binding commitment to reduce greenhouse gas emissions, the country has been making efforts to play a significant role in combating the impacts of climate change by attempting to live up to its commitment to comply with the international community in UN conventions.

The Lao PDR submitted an endorsement project proposal to prepare the initial Biennial Update Report (BUR) with the support of UNEP in order to comply with UNFCCC decisions. In June 2014, the first BUR proposal was submitted to the GEF Trust Fund, obtaining financial support for its preparation. It is understood that the overarching goal of BUR preparation is to assist the country in integrating climate change considerations into national and sectoral development policies by continuously strengthening institutional and technical capacity. The BUR will consist of at least seven components, including national circumstances updates, national inventory of anthropogenic GHG emissions and removal by sinks of all greenhouse gases, information on mitigation actions and their effects, and information on domestic measurement, report, and verification.

The concept of Nationally Appropriate Mitigation Actions (NAMAs) was introduced in the 13<sup>th</sup> Conference of the Parties (COP13) which calls for sustainable development to non-Annex I parties. With support from UNDP, the concept note for the Lao PDR's NAMA development was proposed, highlighting activities and elucidated various options for the design of NAMAs. Following what was stated in the concept note, the Lao PDR currently focuses on the energy sector, especially the implementation of rural electrification. The improvement of the electrification rate in rural areas is the overall objective for developing

strategies under the NAMA framework. The strategy for NAMAs comprehensively describes financing options to promote projects, which allows MoNRE to approach donors to negotiate financing options of proposed electrification measures in the energy sector.

## Policy development for mitigation actions

Since the Lao PDR joined in the global community by ratifying the UNFCCC in 1995, a series of legal and regulatory frameworks, particularly strategies and action plans, were designed in order to ensure ecological sustainability. The strategy on climate change of the Lao PDR was developed and promulgated in 2010. The goals of the strategy are to: (1) reinforce sustainable development which includes measures to achieve low-carbon economic growth; (2) increase resilience in key sectors such as national resources for the national economy to adapt climate change and its impacts; (3) enhance cooperation, strong alliances and partnerships with national stakeholders and international partners to implement the national development goals; and (4) improve public awareness and let various stakeholders understand about climate change occurring, country's vulnerabilities to impacts, GHG resources and significance of their contributions. It is also important to show how climate change will affect the country's economy, which helps to increase involvement from stakeholder for climate actions. The strategic priorities for mitigation options in the Lao PDR emphasize the following key sectors:

### (1) Agriculture and food security sector

Mitigation efforts include reducing methane from paddy fields, enteric fermentation by improving production efficiency, livestock manure through balanced feeding, and promoting new technology transfers;

### (2) Forestry and land use change sector

The largest GHG emitter in the Lao PDR and the options for reducing emission from this sector are to stop "slash and burn" agriculture by forest management, afforestation of degraded areas and implement reforestation, reduce off-site burning by providing alternative fuels for forest-dependent communities, reduce forest fire by establishing proper regulations and necessary measures, and integrate forest management;

### (3) Energy and transport sector

Mitigation priorities in this sector include the following: electrification in rural areas, accelerating development of renewable energy, promoting cleaner energy use and energy efficiency and conservation, including the use of low-carbon transport;

### (4) Industrial sector

Improvement of energy efficiency during the production process and promotion of use of waste biomass or agricultural residues to produce renewable energy are the selected mitigation options in this sector;

### (5) Urban development sector

Mitigation actions mainly focusing on dealing with solid waste through applying the 3Rs (reduce, reuse and recycle), upgrading solid waste collection services and constructing new landfill facilities.

## Climate Change Action Plan of the Lao PDR (2013-2020)

The Climate Change Action Plan of Lao PDR 2013-2020, which follows the climate change strategy, has been developed and is expected to provide guidance to central and local government agencies, as well as mass organizations, the private sector and other groups to play their parts in addressing climate change mitigation and adaptation in a sustainable manner. This action plan is also an important part of the Lao PDR's contribution to international climate change efforts under the UNFCCC.

Development of new renewable energy resources has not yet been widely explored in the Lao PDR. The renewable energy development strategy was therefore formulated in 2012 as an essential effort to promote renewable energy development and as an important component of national economic development to ensure energy security, sustain socio-economic development, and enhance environmental and social sustainability. One significant objective of this strategy is to ensure environmental and social development through the enforcement of adequate safeguards, particularly reduction of greenhouse gases through replacement of fossil fuels and control of negative impacts from climate change. The promotion and development of subsections such as bio-fuels, small hydropower, solar energy, biogas, other biomass energies, wind energy, and other alternative energy sources for transport are defined in this renewable energy development strategy.

The strategy established the long-term goals of the Sustainable Transport Strategy and Action Plan 2020, which facilitates achievement of its goals and implementation measures. The main targets include reducing GHG emissions up to 25 percent of total transport related emissions until 2015, and 30 percent until 2020, through the promotion of transport without the use of engine vehicles (walking, cycling); through the promotion of public transport in urban areas (bus, taxi, tuk-tuk) by 15 percent of total sector emissions until 2015, and by 30 percent until 2020; and through encouraging both private and public vehicles inspection that will ensure effective fuel consumption. By realizing those targets, some recommendations were provided, such as the promotion of research and development on alternative transport options that optimizes and maximizes socioeconomic and environmental benefits in various sections including public transport, alternative fuels, noise control equipment/materials, environmentally-friendly vehicles, development and improvement of appropriate regulations, standards and guidelines for sustainable transport development.

## Conclusion

It is believed that each country has its very own challenges in terms of how it formulates its policies or how it conducts its decision-making process and consensus-building. Different needs of stakeholders and state of geographical and environmental conditions are also issues to be considered.

In spite of that, the Lao PDR has taken its first steps toward advancing its institutional arrangements to effectively counter the effects of climate change. Far from perfect, members of the TWGCC are continuously discussing how to improve the institutional arrangements with partner organizations, especially from the point of view of increasing the efficiency in project selection and implementation, as well as to how to conduct the corresponding MRV.

Current arrangements of the high-level inter-agency NSCCC and NEC give the necessary space for the participation of all line ministries, and it is believed that consensus-building and decision-making will be expedited by centralizing all the key decision matters in relation to climate change issues in this committee.



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### 3 Recent NAMA-related projects and activities in Mongolia

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## NAMAs in the context of national (climate change) plan

### Nationally Appropriate Mitigation Actions in the Construction Sector in Mongolia

Host Country	Mongolia
Implementing Organization(s)	Ministry of Construction and Urban Development (MCUD), Ministry of Environment, Green Development and Tourism (MEGDT) and Ministry of Energy (ME)
Sector	Construction
General	Climate change
Specific	Energy efficiency

#### Project summary

Ever since Mongolia presented its intentions concerning Nationally Appropriate Mitigation Actions (NAMAs) to the UNFCCC, it has explicitly expressed its commitment to pursue the development and implementation of NAMAs. Mongolia's NAMA concepts identify 21 mitigation options in four major GHG-emitting sectors including energy, industrial process, agriculture and forestry. Of these concepts, four focus on energy efficiency in the construction sector.

A full-fledged GEF project entitled "Nationally Appropriate Mitigation Actions (NAMA) in the Construction sector in Mongolia" was jointly prepared by MCUD and MEGDT. The concept note of the project was approved by the donor in earlier 2014. The project aims at developing an 'umbrella' approach that will incentivize low emission and sustainable development in the buildings sector in Mongolia and implementing selected feasible mitigation actions. A team of consultants has been working on development of the Project Document.

The construction sector<sup>1</sup> in Mongolia is heavily reliant on coal as a primary source of energy, hence, a significant source of corresponding GHG emissions. During the last ten years, historical data on the building stock in the country show a total floor area of approximately 20 million m<sup>2</sup>. With rapid urbanization and strong housing demand, this figure is projected to increase to almost 40 million m<sup>2</sup> from 2015 to 2025. For a country that requires eight months of heating in average, fuel combustion and fugitive emissions have become the largest sources of GHG emissions, accounting for more than 50% of gross CO<sub>2</sub> emissions in the business as usual scenario. The Second National Communication (SNC)

<sup>1</sup> In the Mongolian context, "construction sector" refers to heavyweight, multi-storey commercial and residential apartment buildings (and a few private houses); since these are the only buildings connected to water supply, sewage, district heating and domestic hot water systems. Forty percent of the urban population lives in multi-storey buildings.



estimates that the commercial and residential sector makes up 12% of the total GHG emissions from fuel combustion in 2006 by sources. As such, the residential sector accounts for around 16% of total energy use in the country, 11% of commercial energy use (excluding firewood); 3% of direct GHG emissions and 26% of total electricity use. GHG emissions from the residential sector are projected to increase, largely due to the increase of urban population with a rate of 2.81%. Energy consumption in the buildings sector is estimated to increase 1.84 times in 2020 and 2.55 times in 2030 from the base year of 2006. These projections indicate that Mongolia's GHG emissions will rise above 2006 levels by about 2.1 times in 2020 and 3.2 times in 2030.

The latest energy sector modeling results estimate potentials to reduce building sector energy use by 35% against 2010 baseline through green energy options, such as enforcing energy efficiency (EE) standards, retrofitting of existing buildings and providing insulation to those living in traditional dwellings. Investing in sustainable/green buildings in Mongolia, therefore, offers a compelling opportunity for mitigating GHG emissions while also improving the quality of life for the citizens. The proposed project responds to Mongolia's need to generate ever more resource efficiency in the construction sector. A set of barriers impede the large-scale development of resource efficient buildings. The project is distinct to, and bolsters the impacts of previous projects relevant to the buildings energy efficiency sector, such as the UNDP/GEF Buildings Energy Efficiency Project (BEEP) and the Second National Communication. The most notable are listed below: (a) Lack of capacity and institutional arrangements in the identification and prioritization of appropriate and cost-effective energy efficient measure, (b) Limited market diffusion of energy efficient technologies: This barrier can be further elaborated as (1) Technical barriers, (2) Regulatory and institutional issues, (c) Financial barriers, and (d) Lack of information and awareness.

These challenges have triggered the Government of Mongolia to continue its efforts to accelerate the widespread promotion of energy-efficient buildings in a sustainable and timely manner. Some of the targeted interventions under the government's comprehensive package of EE-based policies and projects include the formulation of the draft Energy Efficiency and Energy Conservation Law and Green Development Strategy. The proposed project will complement these broader climate change and economic development strategies. In addition, the government has been lately promoting energy efficiency technology diffusion with a vision where the private sector will have a key role to play. Therefore, without the GEF Project, private sector involvement is likely but the scale is anticipated to be much limited than what has been targeted by the proposed project.

The proposed project is structured around three components anticipated to support the achievement of the project objective, i.e., to facilitate market transformation for energy efficiency in the construction sector through the development of NAMA.

- a) Component 1: Establishment of Baseline Energy Consumption and GHG Emissions in the Construction Sector** - Measuring emissions for an entire sector is no easy feat and has its unique challenges. But it is a critical first step towards successful implementation of scaled up mitigation actions including the NAMAs.
- b) Component 2: Development and Implementation of NAMA in the Construction Sector** - In achieving this outcome, the following indicative activities are envisioned: (a) formulation of detailed marginal GHG abatement cost curves for the construction sector; (b) in-depth evaluation of mitigation actions and prioritization of the most cost effective measures; (c) conduction of policy studies to come up with recommendations on concerted policy framework to support broad-based mitigation actions that reduce GHG emissions and simultaneously achieve development objectives in the construction sector; (d) identification of design elements of a NAMA reflecting, for instance, objective and targets of the NAMA, scope and rationale, delineation of the NAMA boundary, implementation and operational costs, timeframe, etc.; (e) assessment and provision of recommendation on institutional arrangements for operation and coordination among government

agencies and key stakeholders for the construction sector NAMA; (f) conduction of capacity development training for private and public sector participants to evaluate, formulate, implement and access financing for NAMA; (g) implementation of the construction sector NAMA; (h) commissioning of energy efficient technology applications for pilot demonstration, such as efficient lighting, cooking stoves, water-saving faucets, retrofits, installation of consumer control equipment for demand side management, etc., in at least 70 public and commercial buildings (including office buildings, hotels, etc.).

- c) **Component 3: MRV system for mitigation actions in the construction sector** - A critical requirement for NAMAs is that actions need to be implemented in a measurable, reportable and verifiable (MRV) manner. Recognizing the role of NAMAs to reduce GHG emissions while simultaneously promoting country's sustainable development objectives, the project will advocate a broader approach to MRV that establishes metrics such as: (a) specific energy consumption, (b) GHG emissions, and (c) sustainable development (e.g. job creation, health, etc.), that can be used in the construction sector. Indicative activities include (a) in-depth assessment to determine key indicators and metrics (such as those for mitigation actions, progress, GHG emissions and sustainable development) that will be monitored, reported and verified; (b) development of guidelines and standard methodologies to assess, report and verify GHG and non-GHG outcomes; (c) implementation of MRV system for the prioritized NAMA; (d) conduction of capacity development training to effectively monitor data, evaluate metrics, report and verify mitigation actions and outcomes; training for practitioners and decision makers on how MRV can be used as a tool to assess the effects of NAMAs to the broader national development agenda. The bottom-up data produced under the project from the construction sector will be fed into the National GHG inventory for the TNC.

## National Energy Efficiency Improvement Program in Mongolia

Host Country	Mongolia
Implementing Organization(s)	Ministry of Environment, Green Development and Tourism (MEGDT)
Sector	Energy
General	Climate change
Specific	Energy efficiency

### Project summary

Mongolia has a harsh climate with extremely cold winters. The communist period legacy has saddled Mongolia with an inefficient energy infrastructure<sup>2</sup>. Furthermore, coal is the dominant fossil fuel resource of Mongolia. As a result, Mongolia experiences the twin problems of severe air pollution<sup>3</sup> and high greenhouse gas emissions<sup>4</sup>. After COP15, Mongolia submitted a lengthy and ambitious NAMA, covering among others energy efficiency, which has been ongoing since 2010. Energy efficiency is an attractive solution to the twin problems described above, and despite significant progress without international NAMA support, further progress is hindered by absence of affordable long-term finance. The proposed NAMA support project would seek to address these issues and significantly speed up energy efficiency

<sup>2</sup> Mongolia ranks among the top 20 most energy intensive economies in the world in terms of total primary energy consumption per dollar of GDP.

<sup>3</sup> According to the World Health Organization (WHO)'s database of outdoor air pollution particulate matter, Ulaanbaatar is the world's second most air-polluted city in terms of concentration of particulate matter with a diameter of 10 micro-meters (PM<sub>10</sub>) or less, and the most air-polluted city in terms of concentration of particulate matter with a diameter of 2.5 micro-meters (PM<sub>2.5</sub>) or less.

<sup>4</sup> Mongolia is one of the highest-ranked developing countries in terms of CO<sub>2</sub> emissions per capita.

improvements.

The profile of the project is disclosed on the NAMA registry webpage of UNFCCC as NAMA seeking support for implementation project.

### Project objectives and planned measures

The ultimate goals are to achieve major energy savings, reduce greenhouse gas emissions from fossil fuel power generation and heat generation, and to reduce air pollution. The NAMA support project targets end users and generators of energy (heating only) in Mongolia, and involves the energy sector, and energy efficient lighting and equipment technology suppliers in Mongolia.

The objective of the project is to support the transition of the country towards the use of energy efficient lighting, energy-efficient appliances (space heaters, refrigerators, freezers, etc.) and energy-efficient equipment (heating only boilers, efficient motors, etc). Planned measures consist of setting up a revolving fund to provide long-term loans to support the replacement of inefficient equipment, complemented with the support of the development of product and equipment standards, identification of suitable new energy-efficiency investments, further fund mobilization and the establishment of proper GHG MRV procedures.

### Ambition of the project in reference to the criteria:

- a) **Potential for transformational change**-The project will allow the scaling-up of existing efforts to reduce energy use and safe greenhouse gas emissions, as well as the demonstration of new technologies and equipment to increase energy efficiency. It will therefore offer the possibility to significantly transform the usage of energy in Mongolia.
- b) **Sustainable development co-benefit**-The project reduces air pollution by reducing electricity consumption from almost 100% fossil fuel-based power generation and by reducing the consumption of coal for heating purposes. The project will create job opportunities for local people and business opportunities for private enterprises.
- c) **Financial ambition**- Funding will be blended with other sources of capital, including the domestic private sector and international sources. It is conservatively estimated that an additional 39 million EUR will be leveraged by the NAMA project.
- d) **GHG mitigation potential**-328,848 tCO<sub>2</sub>e emission reductions annually on average over a 10-year period (3.29 million tCO<sub>2</sub>e in total).

### Barriers for mitigation investments

Installation of energy-efficient equipment mainly faces a financing barrier. Interest rates for loans are high, around 25% for USD-nominated loans, while the terms of the loans are typically short (2-3 years maximum) so it becomes difficult to finance energy-efficiency improvement projects. Awareness is another implementation challenge. Customers do not see the real costs of electricity and net benefits of shifting to energy-efficient products, and have often been resistant to even small upfront costs.

### Concept and methodological approach

The project concept is to facilitate access to financing for the replacement of energy-intensive equipment to achieve Mongolia's transition to energy-efficient lighting and equipment. The approach consists of setting up a revolving fund which will allow commercial banks to provide longer terms and low-interest loans to users. This key measure will be supported by actions to increase awareness among stakeholders and formulation of technical norms and standards, identification of types of suitable energy-efficient equipment that can be supported, and outreach to other sources of soft finance. The financial cooperation instruments consist of a two-step loan structure, in which NAMA funds are

provided as a grant to the Delivery Organization, which lends the funds at a long term, low interest rate to commercial banks that operate as partners in implementation. The commercial banks blend the NAMA loans with other sources of funds and provide long term loans (5 years) at a low interest rate to end users for energy efficiency investments. Loan repayments will flow into a revolving fund that will be under management by the Delivery Organization until closure of the NAMA Support Project, at which point the revolving fund will be handed over to the Ministry of Environment, Green Development and Tourism, where it will be merged with a national climate change fund that is currently being set up. Technical support will be provided by external experts under the management and supervision of D.O personnel and NAMA advisory firm.

MRV systems will draw upon the following existing CDM methodologies:

- Demand-side activities for efficient lighting technologies
- Demand-side activities for efficient outdoor and street lighting technologies
- Demand-side energy efficiency activities for installation of energy-efficient lighting and/or controls in buildings
- Substituting fossil fuel based lighting with LED/CFL lighting systems
- Dissemination of energy efficient household appliances
- Energy efficiency and/or energy supply projects in commercial buildings
- Energy efficiency space heating measures for residential buildings
- Energy efficiency and fuel switching measures for industrial facilities.

## Transforming Construction in Mongolia using Supplementary Cementitious Materials

<b>Host Country</b>	Mongolia
<b>Implementing Organization(s)</b>	Ministry of Construction and Urban Development (MCUD), Ministry of Environment, Green Development and Tourism (MEGDT)
<b>Sector</b>	Construction
<b>General</b>	Climate change
<b>Specific</b>	Energy efficiency

### Project summary

Mongolia is experiencing a rapid economic transformation generated by mineral discoveries. GDP grew 12.3% in 2012, one of the highest rates globally. At the same time, the country is embarking on one of its largest infrastructure investments ever, including spending \$40.5bn in energy, housing, rail, roads and industry.

Cement production is highly GHG-intensive, emitting approximately 1 ton of CO<sub>2</sub> per ton of cement on average (in Mongolia 1.2 tCO<sub>2</sub>e), and is responsible for 5-10% of total emissions globally. 25% of total coal consumption in Mongolia is used for cement production.

The objective of the proposed NAMA is to initiate the transformation of Mongolia's construction sector towards a less carbon-intensive development path through the introduction of supplementary cementitious materials (SCM) that can replace up to 70% of cement in concrete. SCM are produced by a mechanical process that consumes 90-95% less energy compared to cement manufacture. The envisaged measures consist of the establishment a 350,000 t/y SCM production facility, design of supportive policies, and management of the standardization process.

The project is expected to obtain emissions reduction of some 420,000 tCO<sub>2</sub> annually, and will use recycled fly ash from local coal-fired power plants as raw material, producing a positive impact on concrete quality for end-users.

The profile of the project is disclosed on the NAMA registry webpage of UNFCCC as NAMA seeking

support for implementation project.

### Potential for transformational change

The Project fits into Mongolia's NAMAs outlined in Appendix II of the Copenhagen Accord of December 18, 2009, and reiterated in Mongolia's Second National Communication (SNC) with UNFCCC in 2010. One national objective for the industry sector is to implement energy efficiency improvements, and it is suggested to introduce dry-processing for the cement sector. The outlined NAMA support project addresses earlier recognized the need to improve performance in the cement sector, but is a superior alternative because it does so in a more cost-effective manner with higher mitigation impact than originally envisaged. The project will contribute to significant reduction in coal consumption in industry sector through displacing the use of ordinary Portland cement which production represents 25% of all industrial coal usage in Mongolia (source 2nd National Communication to UNFCCC). Wider introduction of SCM in concrete mixing has been hindered by a variety of barriers, including interest from entrenched Portland cement companies that wish to protect their traditional production technologies, difficulties in getting initial projects funded, as well as ensuring that the use of SCM would meet national standards (which are geared towards the use of Portland cement). Some support is needed to ensure SCM would have a market.

The project will design supportive policies and appropriate national standard for SCM, and will allow for concrete users to consider SCM based on performance (e.g., strength, setting time, CO<sub>2</sub> per ton) rather than chemical composition, which may differ from ordinary Portland cement. These measures, combined with the establishment of a commercial-scale plant, will alleviate perceived risks associated with disruptive technology. The combination of the high emissions factor, popular use of Portland cement worldwide, and wide availability of raw materials, means that SCM has the technical and economic potential of reducing global GHG emissions by over 1 billion tCO<sub>2</sub> annually.

The introduction of supplementary cementitious materials (SCM) is a very innovative approach for the reduction of emissions because unlike UNFCCC's Clean Development Mechanism, which incentivizes existing GHG intensive cement companies to implement reductions measures within the Portland cement production paradigm, the NAMA project involves demonstration of an environmentally sound alternative to cement, thereby transforming the building materials industry. In other words it encourages innovation, not polluters.

### Co-benefits

The outlined NAMA Support Project brings the following co-benefits:

- a) **Environmental-** The project uses either fly ash recycled from coal-fired power plants or very abundant natural resources (volcanic ash) as raw material, while PC production consumes the depleting natural reserves of limestone; the project reduces coal-based energy consumption by 90% and reduces water demand in concrete by 40% compared to PC-based concrete; avoided harmful emissions of mercury and particulate matters associated with coal consumption can contribute to reduce atmospheric pollution.
- b) **Performance-** SCM delivers stronger and longer-lasting concrete; SCM concrete improves mitigation of alkali-silica reactivity, reduces heat of hydration, reduces concrete permeability, improves protection from chloride and sulphate attacks; paving roads with SCM concrete significantly increases paving productivity and road surface durability, as well as reduction of petrol consumption by about 5%; by extending the life of structures, SCM concrete extends their replacement cycle, while at the same time reducing maintenance costs.
- c) **Economic-** Plant construction costs as low as 1/10th of PC plant; replacement of energy intensive PC process with mechanically-activated SCM means low O&M costs; competitive market price



of SCM most similar to ordinary PC; superior return on investment due to a combination of lower CAPEX and OPEX.

### Mitigation potential

In absence of the proposed project, ordinary Portland cement would be used in concrete production. Portland cement production is GHG-intensive and US EPA states that total CO<sub>2</sub> emissions from the cement pyroprocess depend on energy consumption, and generally fall in the range of 0.85 to 1.35 t of CO<sub>2</sub> per t of clinker. In Mongolia, introduction of a 350,000 t SCM plant is expected to result in some 420,000 tCO<sub>2</sub> emission reductions (1.2 tCO<sub>2</sub> / t SCM product) due to existing inefficient wet type kiln system (World Bank 2011).

Over the 20-year lifetime, the project would reduce 8.4 million tCO<sub>2</sub>e. In other countries in which the production of Portland cement uses more efficient production processes, the amount of emission reductions would be lower, but still significant (0.8-1.0 tCO<sub>2</sub> / t SCM product).

Additional GHG emission reductions may also be achieved in the case where SCM-based concrete is used for paving roads, as it would result in 5% reduction in petrol consumption compared to using PC based concrete paving (source: technology provider supported by U.S third party test reports).

According national newspaper UB Post, 6000km of roads require restoration.

According to 2011 World Bank report "Carbon Finance in Mongolia", the introduction of SCM is the most cost-effective GHG emission reduction measure in the cement industry after considering the following alternatives:

- Change kiln system from wet to dry type
- Use of waste heat from rotating kilns
- Fuel switch
- Improvement of sealing of dust system

## Finance and technology transfer in the context of JCM to promote NAMAs

### Feasibility Study of Programme-type Finance Scheme for the JCM in Mongolia to Promote NAMAs

Host Country	Mongolia
Implementing Organization(s)	Ministry of Environment, Green Development and Tourism (MEGDT) and Ministry of Energy (ME), Asian Development Bank (ADB), Ministry of the Environment, Japan (MOEJ)
Sector	Energy Sector
General	Climate change
Specific	Energy efficiency and renewable energy

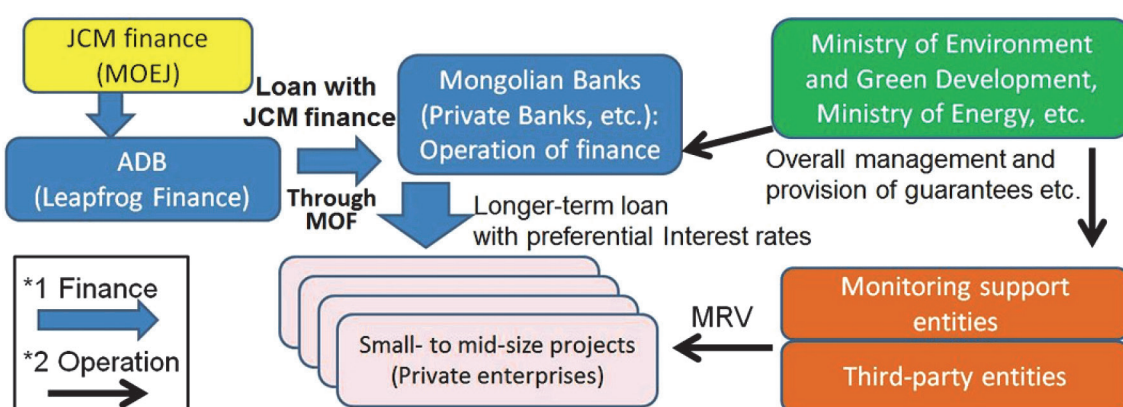
### Background

Driven by recent rapid economic growth fueled by a booming mineral mining industry, coupled with a massive influx of the population to the capital city Ulaanbaatar, the total electricity demand in Mongolia's central energy system has been rising sharply over the past few years. Added to this issue is an ever-worsening situation of air pollution whose main culprits include coal-fired power plants and as well as mining and manufacturing production. Thus, it has become a pressing need of the country to tackle the issues of energy security and air pollution at the same time in an integrated manner, and Mongolia has high expectations for the JCM to become a tool for the country to achieve this goal. Some preliminary studies have revealed that introducing relatively small-scale energy saving devices would be an efficient way to help the country achieve this very goal.



### Concept of the study

Against this background, the proposed study will be carried out in order to design a programme-type finance scheme for the JCM using an ADB (Asian Development Bank) Two-Step Loan with JCM leapfrog finance (JFJCM: Japan Fund for the Joint Crediting Mechanism) in partnership with a local bank that will facilitate the implementation of small- to middle-scale JCM projects, whose concrete examples include: introduction of high-efficiency HOBs, and high quality solar panels including introduction of high-efficiency electric transformers. The scheme will thus eventually contribute to achieving the objectives of enhancing energy security and reducing the air pollution, thereby promoting Mongolia's sustainable development. With this scheme, Mongolia will promote NAMAs and contribute the greenhouse gas emission reduction under the UNFCCC.

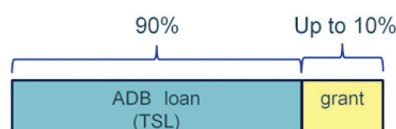


\*MOEJ: Ministry of the Environment, Japan, \*MOF: Ministry of Finance, Mongolia

\*MRV: Measurement, Reporting and Verification, \*ADB: Asian Development Bank

### Flow of the proposed financial scheme

- (a) The ADB lends a certain amount of money to Mongolian private banks through the Ministry of Finance, Mongolia, which will be supplemented by a grant from the Ministry of the Environment, Japan (MOEJ). MOEJ grant provides up to 10 % of total, whereas the remaining would be covered by ADB loan.



- (b) To utilize the ADB finance, Mongolian private banks support small-to-mid-size projects of private enterprises with longer term loan with preferential interest rates.
- (c) A secretariat under the Government of Mongolia manages, supervises and supports private banks and private enterprises.
- (d) If participating private enterprises are not familiar with the MRV requirement of the JCM, the monitoring support entities will help with monitoring, reporting and preparation for the verification process in accordance with the requirements of the JCM. Eventually, third-party entities will conduct the verification process.

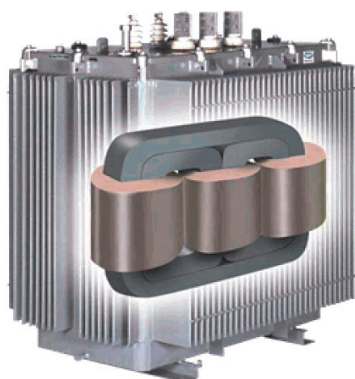
Figure 1: Expected low carbon technologies to be applied



High Quality Solar Panel



Three-level Inverter Control



High Efficiency Amorphous  
Core Transformer



Co-benefit-type High Efficiency  
Heat Only Boiler

### Effect expected from the scheme

- The use of government guarantees and JCM grant finance will enable the introduction of advanced low carbon technologies with the use of longer term loans with preferential interest rates.
- As the finance size is several millions or tens of millions of USD, it is difficult to finance small projects with general ADB sovereign loan and non-sovereign loan schemes. However, this kind of two-step loan-type finance can facilitate the implementation of small-to-middle-scale JCM projects.
- The ADB lends a certain amount of money to Mongolian private banks through Ministry of Finance, Mongolia, so local entities will effectively manage a number of small-to-middle-scale projects. It is also a good opportunity to conduct capacity building activities to develop green finance-related skills in Mongolia.

### Future prospect

The Mongolian Government, the Japanese Government and the ADB are now discussing the structure and institutional arrangement of the Programme-type JCM finance scheme. After the scheme has been finalized in detail, the Ministry of Finance, Mongolia and the ADB will start the loan negotiation. The three entities are planning to start the scheme from 2015 or 2016.

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## 4

## Fostering investment in biomass waste-to-energy technologies – the case of Peru

By

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## Introduction

The transition towards a low carbon world requires a shift in investment from high carbon technologies to low and zero carbon alternatives. International climate finance and other support can help to enable this shift. The challenge for decision makers is to deploy the scarce public resources in the most effective way to remove barriers to investment and maximise the redirection of private sector finance flows. Nationally Appropriate Mitigation Actions (NAMAs) are one of the frameworks under which international climate finance can be deployed to advance mitigation and sustainable development in developing countries. There is a growing body of experience on how NAMAs can be designed to remove barriers to investment across different sectors. The design of financial mechanisms is emerging as one of the core elements of successful NAMA development.

NAMAs have gained increasing attention in Peru over the last four years as a vehicle of low carbon development. A NAMA on *Sustainable Energy Production from Biomass Waste*, which will be presented in this article, is one of several NAMAs currently under development in Peru.

Energy supply is still critical in remote areas of Peru where the national grid does not reach. Terrain is often difficult for infrastructure construction and communities are small and scattered over a large area. The latest 2013-2023 National Rural Electrification Plan aims to provide electricity access, including from renewable energy sources, to 6.2 million people in rural, isolated and border regions within the next decade (IRENA 2014). The major activity components under the plan are grid extension into rural areas, and the development of renewable energy mini-grids in areas where grid extension is not possible. Biomass waste-to-energy activities have the potential to help fill the energy gap. Approximately 31 million tonnes of agricultural and 0.34 million tonnes of forestry residues are disposed locally each year, resulting in high costs for producers or in environmental pollution if waste is disposed illegally. The majority of agricultural crops with waste-to-energy potential are produced by small and medium-sized farmers. Only sugar cane, the crop with the largest energy generation potential, is produced by farmers with landholdings over 100 hectares. The production patterns indicate that waste-to-energy activities are an interesting option to add value to agro- and forestry production and processing and to increase energy access in rural areas of Peru. Waste-to-energy projects would also contribute to the national target of supplying 40 percent of the energy demand by non-conventional renewable energy.

The objective of the NAMA is to generate sustainable energy from biomass waste to promote rural sustainable development while contributing to achieve Peru's renewable energy target and global climate change mitigation. Specifically, the NAMA aims to:

- Promote investment in biomass waste-to-energy technologies through a financial support scheme for farmers and agro-forestry industries;
- Develop and enhance national capacities to design, implement, monitor and evaluate waste-to-energy generation projects.

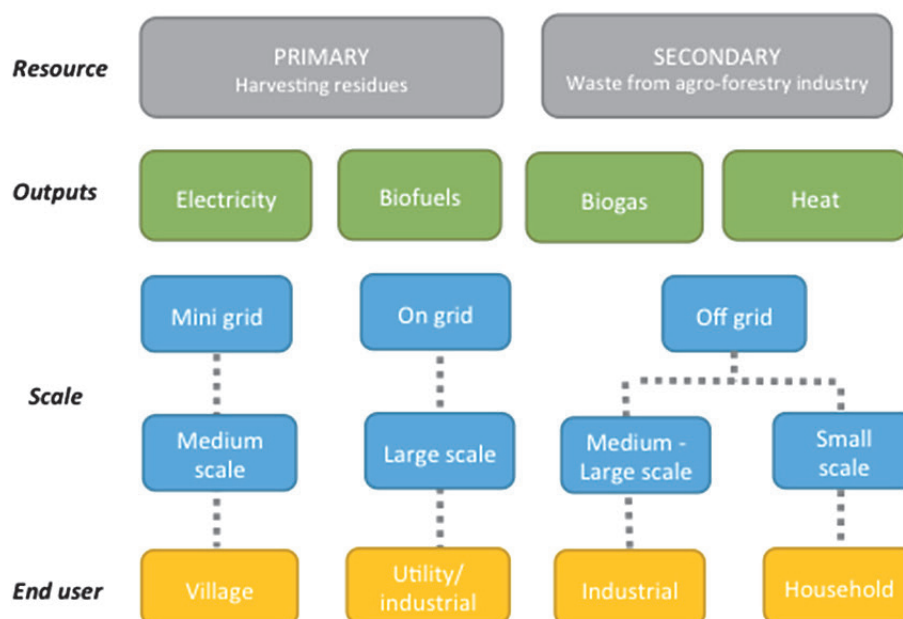
## **One size fits all? Waste-to-energy generation potentials of different stakeholder groups and available promotion schemes**

Energy needs and waste-to-energy generation potentials of Peruvian farmers and agro- and forestry industries are as diverse as the sources of waste (Figure 1). Through promotion under the NAMA framework, the installed capacity of waste-to-energy projects could reach around 800 MW by 2025. The largest contribution, about 70 percent, will come from the sugar cane industry for on-grid and off-grid energy systems. Rice mills, palm oil, cotton and poultry production are other important sources of biomass waste in Peru with a significant energy generation potential. Moreover, coffee, cacao, corn, potatoes, barley, olives, grapes, among others, are produced by tens of thousands of small-scale producers and biomass waste could be used to generate energy for self-supply in production processes or at the household level.

The Peruvian government has set up a framework of policies, programmes and plans to promote and finance the development of the renewable energy sector, including waste-to-energy technologies. One element of this framework are technology-specific, renewable energy auctions for large-scale on-grid projects. For each auction and technology, cap and price ceilings are determined. While the first two auctions were successful for some technologies such as wind and solar PV systems, only a small share of the available biomass allocation could be awarded. Possible reasons for this result are, for example, the short-term nature of auction allocations which prevents investments in less mature technologies

such as waste-to-energy technologies. The award structure also promotes aggressive bidding and creates a mismatch between values and risks. At the first auction, price differences between offers for waste-to-energy projects were very large, resulting in a ceiling price that was too low for most bidders to be able to develop profitable projects (Reegle, 2014).

Figure 1: Outputs, scale and end users of waste-to-energy projects



Source: adapted from Cameron et al. (2014)

Peru already has a well-established financial infrastructure to support renewable energy projects. The national development bank COFIDE, for example, has launched the “Bionegocios” programme to promote changes in the national energy matrix as well as the sustainable use of natural resources. Under the renewable energy branch of the programme, project finance is made available for investments in large-scale non-conventional renewable energy projects, including waste-to-energy projects. COFIDE also operates as a second-tier bank and channels funding to local banks and finance companies that offer (micro) credits to developers of small to medium-sized projects. Other funds and programmes, such as the *Fondo de Inclusión Social Energético* (FISE, Fund for Social and Energy Inclusion), are specifically targeting small-scale (renewable) energy projects to reduce poverty and foster rural development by increasing energy access in rural areas.

Currently available financial resources do not match the amount that will be needed to upscale existing and planned waste-to-energy projects and programmes, especially in the field of energy access in rural areas. Moreover, terms of existing credit lines need to be improved to reduce the investment risk for less mature segments of the renewable energy market which includes waste-to-energy technologies. Compared to investments in conventional energy projects, public banks require higher collateral for credits for waste-to-energy projects. Transaction costs associated with structuring a deal are often considered to be too high, since projects are still in the pilot phase and small in scale. However, most importantly, the knowledge on energy generation potential of biomass waste has to be increased among potential stakeholder groups, including ministries, banks, industries, farmers and project developers. Little information is publicly available on experiences with existing waste-to-energy projects. Technical data



and scientific information that is needed for the assessment of the costs and benefits of waste-to-energy projects is disperse, obsolete, not available or not adapted to the national context. Due to these factors, agricultural and forestry biomass waste is yet a largely untapped resource for sustainable energy generation in Peru.

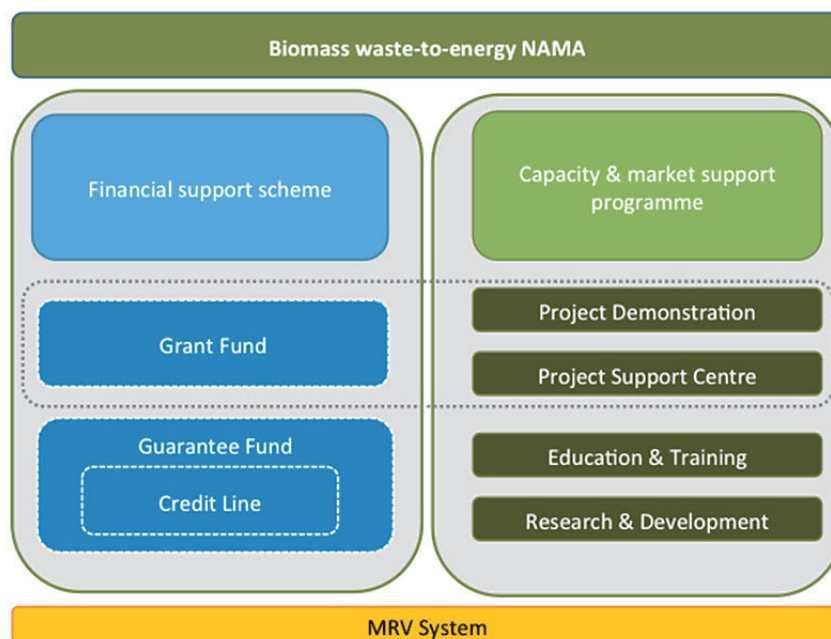
## Building blocks of the NAMA

The proposed NAMA comprises various activities which address the identified barriers to the implementation and finance of biomass waste-to-energy projects in Peru. The core element is a financial support scheme which is accompanied by a capacity and market support programme (Figure 2). The objective of the proposed building blocks of the NAMA is to bundle existing but scattered resources and initiatives under one framework and to provide additional resources that are needed for the scaling up of waste-to-energy projects at the national level.

The financial support scheme comprises different instruments that are designed to facilitate access to finance, reduce project finance costs and incentivise the implementation of sustainable, high quality projects. In particular, the following instruments are included:

- a) **Guarantee fund:** Waste-to-energy projects are perceived as high-risk investments by the financial industry. The guarantee fund will provide credit risk guarantees and risk mitigation structures to enable local banks and finance institutions to provide long-term loans at more attractive terms. This can significantly reduce the costs and increase the availability of project finance.

**Figure 2: Building blocks of the waste-to-energy NAMA**



Source: own elaboration



b) Grant fund: I

- I. Investment grants will be provided to co-finance small-scale projects that face high investment barriers but would have a large positive impact on rural development and/or poverty reduction.
- II. In addition, grants will be provided to project developers to co-finance pre-feasibility studies. The cost of such studies has proven to be a major barrier to project development given the perceived uncertainty of the outcome.
- III. Part of the fund will be dedicated to the provision of results-based finance, made available, for example, for projects that participate in national renewable energy auctions. Even if the rules of the bidding system were adjusted to reduce large price differences between bids, electricity prices may still be too low for some projects to become profitable. For projects with the potential to deliver important benefits, for example, projects that would be implemented in rural areas with low electricity rates, results-based finance could be used to fill the gap between offered and needed electricity prices to reach profitability.

Grant funding is planned to be used in initial years of NAMA implementation, when knowledge dissemination, pilot project implementation, technology transfer and testing of best practices will be important activities to initiate the establishment of a market for waste-to-energy projects, technologies and related services. The timeframe of the NAMA is planned to be a minimum of 10 years (2016-2025) to provide enough time for the activities to mature and to create the continuity that will permit suppliers and service providers to establish themselves in the market. Over the ten-year period, grant funding will be subsequently reduced. During a pilot phase (2016-2020), the NAMA has the goal to finance a minimum installed capacity of 200 MW.

The objective of the capacity and market support programme is to develop and enhance national capacities to design, implement, monitor and evaluate agricultural waste-to-energy energy projects. Where finance is currently available for renewable energy projects, a lack of trained professionals has shown to be a major bottleneck for project development and implementation. The programme targets all relevant actors at the national, regional and local level, including universities, project developers, energy service professionals, the financial service industry as well as relevant government officials. Activities will be designed to the specific needs and knowledge gaps of different stakeholder groups on the demand and supply side.

The combination of finance instruments coupled with the capacity and market support programme is expected to result in significant GHG emission reductions. The direct impact of the NAMA on GHG emissions depends on the scale of implementation of projects and on how fast the waste-to-energy capacities can be installed. According to different scenarios, the potential GHG impact of the NAMA is between 4 and 14 MtCO<sub>2</sub>e reduced emissions over the life time of the projects implemented under the NAMA programme

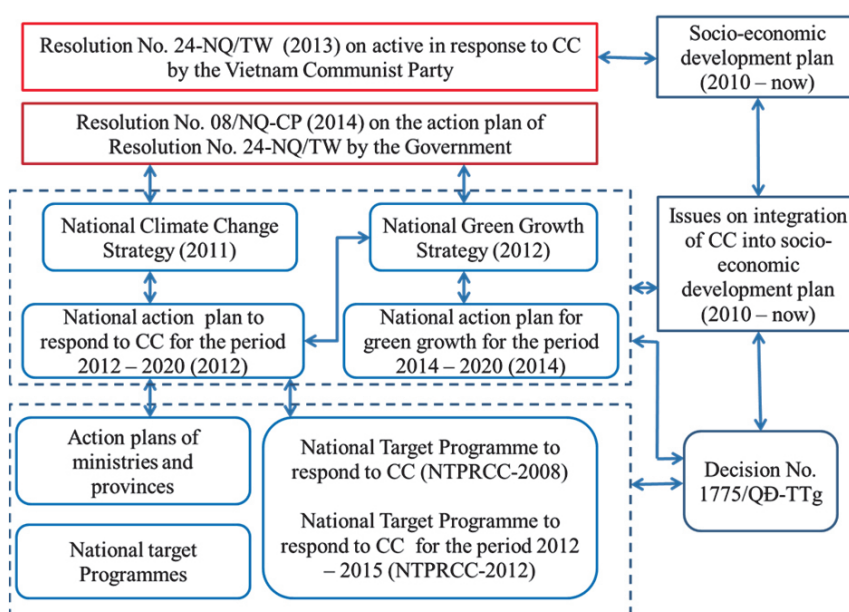
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## Background

The amount of solid waste generation in Vietnam has been steadily increasing in recent years. This trend is predicted to continue in the foreseeable future due to the continuous rapid industrialization and urbanization of the country. While considerable improvements have been made in the waste collection and disposal system in Vietnam in the past decade, landfill open dumping and burning remain popular in the country, thereby causing different types of pollution, although greenhouse gas (GHG) emissions from the waste sector were estimated to account for only 5.3% of the total national GHG emission as of 2000 (MONRE, 2010). On the other hand, with the recognition that Vietnam is one of the most vulnerable countries to climate change impacts, efficient response to climate change has become a top political concern in the country. Consequently, the National Target Program to Respond to Climate Change (NTP-RCC) was developed in 2008 as the first national comprehensive policy on climate change, with the aim of integrating both mitigation and adaptation concerns in to development strategies, programs, and plans in all sectors through a unified platform. The NTP-RCC was followed by a number of additional policies on climate change, including the 2011 National Climate Change Strategy, the 2012 National Green Growth Strategy, and the National Action Plan to Respond to Climate Change in 2012-2020, thus firmly entrenching the goals of sustainable development and green growth in the national development framework (World Bank, 2011). Furthermore, responding to the growing importance of NAMAs in the context of international negotiations under the United Nations Framework Convention on Climate Change (UNFCCC), Vietnam released the Decision No.1775/QĐ-TTg 2012 signed by the Prime minister in 2012, approving the development of NAMA framework and implementation of NAMAs in Vietnam.

Figure 1: Policies on climate change in Vietnam



Source: Adopted from Baseline Study Report for GIZ-NAMA Project, Do, et al., 2014

Development of NAMAs in the waste sector has become one of the priorities of Vietnam. In the decision 1775/QĐ-TTĐ, the Prime minister also approved the emission reduction target of 5% for the waste sector by 2020. Vietnam has made significant progress in developing policies and strategies on solid waste management, including the 2009 National Strategy for Integrated Management of Solid Waste up to 2025 and Vision towards 2050. A remaining challenge for the country is to make these policies and strategies into reality. Given this background, with a view to contributing to the improvement of the waste treatment system and introducing measures to realize a low carbon society with a long-term perspective, we have developed two NAMA scenarios up to the year 2020 in the waste sector of Vietnam under a NAMA capacity building project financed by the Ministry of Environment, Japan (MOEJ) during the Japanese fiscal year of 2013. This project is a further development of the work conducted in the previous year, which was also supported by the MOEJ. This paper aims to introduce the NAMA scenarios and the lessons learned from the implementation of the project.

## Development of two BAU scenarios

Two business-as-usual (BAU) scenarios on future GHG emissions in the waste sector of Vietnam were developed on the basis of two different hypotheses on the annual growth rate of solid waste volume in the country. Scenario 1 is based on the hypothesis that the annual growth rate of solid waste in Vietnam will be 10% until the year 2020, given the recent trend of increase in waste generation outlined in the 2011 National Environmental Report published by the Ministry of Natural Resources and Environment (MONRE) of Vietnam (MONRE, 2011: 16). On the other hand, Scenario 2 assumes that the annual growth rate of solid waste will be considerably lower (3.27%), based on a research paper by the National Institute for Environmental Studies (NIES), Japan (Kawai et al., 2010: 129). It was decided to consider these two considerably different scenarios mainly due to the uncertainties surrounding the data currently available on urban solid waste in Vietnam.

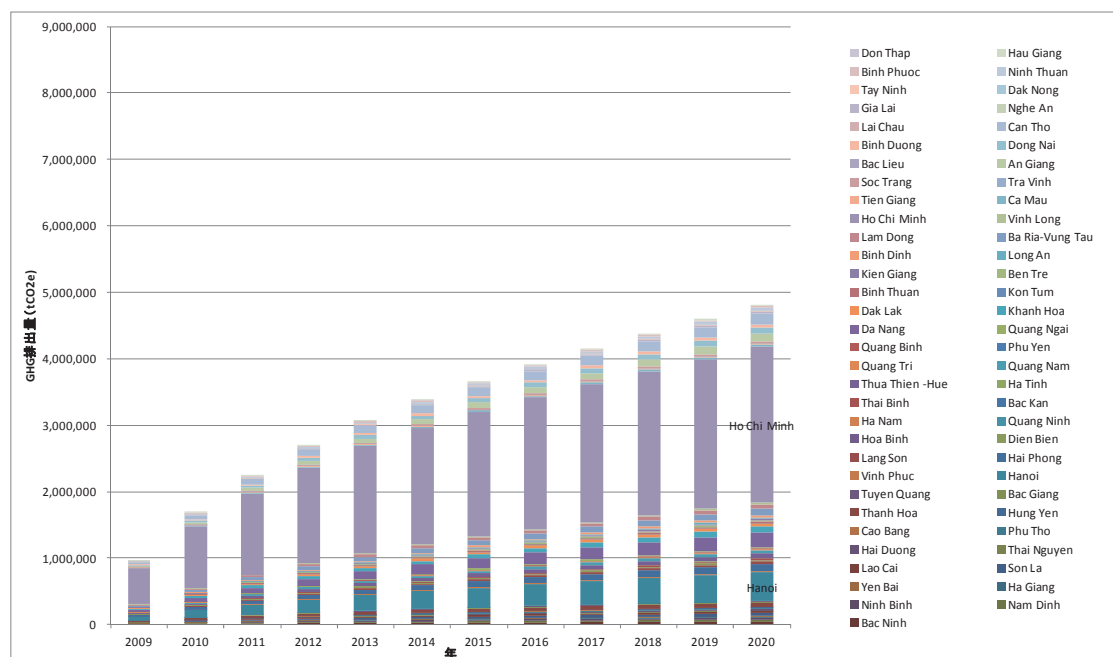
As for the methodologies for calculating future GHG emissions, the First Order Decay (FOD) model was used in accordance with the 2006 Guidelines of the Intergovernmental Panel on Climate Change (IPCC). The formula of the FOD model is as follows:

$$BE_y = \phi \cdot (1 - f) \cdot GWP_{CH_4} (1 - Ox) \cdot \frac{16}{12} \cdot Frac \cdot DOC_f \cdot MCF \cdot \sum_{t=y_0}^y \sum_j A_{j,t} \cdot DOC_j \cdot (1 - e^{-k_j}) \cdot e^{-k_j \cdot (y-t)}$$

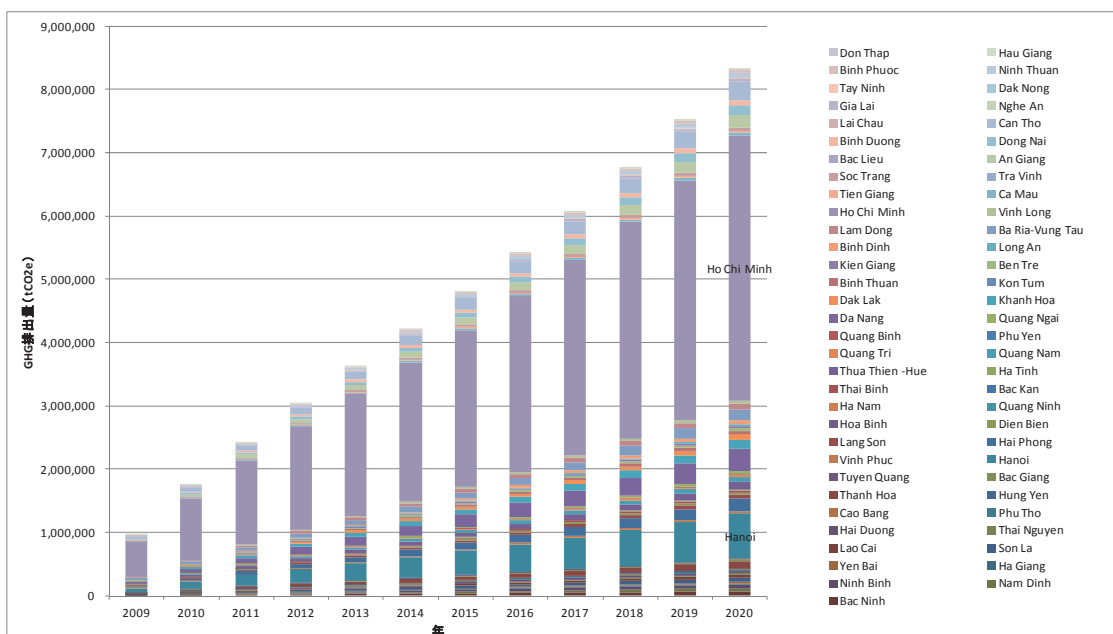
$\phi$	1	Model correction factor
$f$	0	Methane captured factor (IPCC default)
$GWP_{CH_4}$	25	Global Warming Potential of methane (IPCC AR4)
$Ox$	0	Oxidization factor of methane (IPCC default)
16/12	1.3333	CH <sub>4</sub> /C molecular ratio
$Frac$	0.5	Fraction of methane in SWDS gas (IPCC default)
$DOC_f$	0.5	Fraction of degradable organic carbon (DOC) decomposable (IPCC default)
$MCF$	0.8	Methane correction factor for "unmanaged deep >5m" SWDS (IPCC default)
$A_{j,t}$		Annual amount of organic wastes of type $j$ in year $t$ . $A_{j,t} = A_t \cdot \%A_j$
$DOC_j$		DOC content of waste type $j$ (table)
$j$		Waste type
$k_j$		Methane generation rate of waste type $j$ (table)
$(1 - e^{-k_j})$		Constant for calculation of geometric series over $t$
$y_0$		Start year of the targeted waste disposal
$y$		Target year considered

Figure 2 shows the results of the calculations in Scenario 1 and Scenario 2:

Figure 2: Estimated future GHG emissions in the 2 BAU scenarios



[Scenario 1: Annual growth rate of solid waste volume: 3.27%]



[Scenario 2: Annual growth rate of solid waste volume: 10%]

As shown in Figure 2, in 2020, the total GHG emissions in the waste sector are expected to reach approximately 5 million tCO<sub>2</sub>e in Scenario 1 and over 9 million tCO<sub>2</sub>e in Scenario 2.

## Questionnaire survey applied to Urban Environment Companies (URENCOs) on the situation of solid waste collection and disposal

Following the development of the two BAU scenarios, a questionnaire survey was conducted with Urban Environment Companies (URENCOs) – semi-public entities in charge of solid waste collection and disposal in each province/large city in Vietnam – from November 2013 to February 2014, to examine the plausibility of the above-mentioned two BAU scenarios and identify appropriate NAMA technology options for each landfill site. A total of 53 URENCOs, which manage 73 landfill sites in total, responded to the survey<sup>1</sup>. The main findings of the questionnaire survey are as follows:

- 1) Opening year of landfill sites: Almost 90% of the landfill sites were built during the past 20 years;
- 2) Disposal completion rate: More than 80% of the total disposal capacity has been already used in more than half of the landfill sites; many of them have been filled up recently or are expected to be filled up very soon;
- 3) Population and waste volume: Over 80% of the surveyed URENCOs collect solid waste from a population of fewer than 400,000 people; about 60% of them collect less than 50,000 ton of waste annually;
- 4) Waste composition: Highly degradable waste accounts for 72.6% of the total waste composition on average;
- 5) Collection fee: URENCOs collect an average 14,100 VND/month per household as the waste collection fee<sup>2</sup>.

Thus, the questionnaire survey helped us gain insights into the current situation of solid waste collection and disposal in Vietnam. In terms of the disposal completion rate, although most of the landfills are relatively new, their remaining disposal capacity is generally quite limited. Therefore, measures to address this situation, including construction of new landfill sites or reduction of the waste volume disposed in the existing landfills through application of new waste treatment technology, are acutely needed. Indeed, 53 out of the 73 URENCOs surveyed answered that they would like to introduce more advanced waste treatment technology within three years. Also, as the data on population and waste volume suggest, most of the URENCOs collect and dispose of solid waste on a relatively small scale, and the average collection fee is quite low. As such, low-cost technology solutions with small-scale applicability are considered appropriate for most URENCOs. In addition, since highly degradable waste makes up a very large proportion of solid waste – a tendency generally observed in other developing countries in the tropics – technologies suitable for treating solid waste with high organic content are necessary.

## Identification of four NAMA technology options and development of technology application criteria

There are many waste treatment technologies. However, in order to apply them to Vietnam, these technologies are required to be low cost, popular, easy to operate and aligned with sustainable

<sup>1</sup> According to the URENCO Hanoi, which supervises the activities of all URENCOs in the country, there are 63 URENCOs in total, managing 90 large-scale landfills.

<sup>2</sup> 14,100 VND is approximately 0.70 USD as of January 2015.

development. The long list of technologies was screened and four standard waste treatment technologies were selected as potential NAMA technology options: 1) aerobic treatment (composting); 2) incineration for power generation (waste to energy); 3) landfill gas (LFG) capture and flaring; and 4) semi-aerobic landfill technology. And building upon the results of the URENCOs questionnaire survey, application criteria for these technologies were developed as shown in Table 1:

Table 1: Application Criteria for NAMA technology options

	Technology options	Application Criteria
1	<b>Aerobic treatment (Composting)</b>	(1) "Population in waste collection area" is <b>fewer than 200 thousand people</b> and/or "Volume of collected MSW" is <b>less than 30 thousand ton/year</b> . (2) The combined ratio of moderately/rapidly degrading waste is <b>over 70%</b> .
2	<b>Incineration for power generation</b>	(1) "Population in waste collection area" is <b>over 800 thousand people</b> and/or "Volume of collected MSW" is <b>over 100 thousand ton/year</b> . (2) "Waste collection fee from households" should be at least 14,100 dong/month (national average).
3	<b>LFG capture and flaring</b>	(1) The landfill completion rate is <b>below 80%</b> and/or "Completion year of landfill site" is <b>later than 2015</b> . (2) "Type of landfill" is Type 1 (managed – anaerobic)
4	<b>Semi-aerobic landfill technology</b>	(1) The landfill completion rate is <b>below 80%</b> and/or "Completion year of landfill site" is <b>later than 2015</b> . (2) "Type of landfill" is not Type 2 (managed – semi-aerobic) (3) "Start year of landfill site" is later than 2010.

The application criteria were developed, considering both the characteristics of each technology as well as the current situation of solid waste collection and disposal revealed by the questionnaire survey. Composting is a technology option that is only applicable on a small scale and appropriate for highly degradable waste. On the other hand, incineration is a high-cost option appropriate for treating large amounts of waste. Given the financial implication for introducing this particular technology, a minimum threshold of the collection fee per household was set at the national average of 14,100 VND/month, in addition to the conditions on population and waste volume. While these first two options are used for intermediate waste treatment, the third and fourth technology options: LFG capture and flaring and semi-aerobic landfill technology are applied to the landfill sites as final treatment options. Therefore, specific conditions of landfill sites were included in the application criteria for these two technologies. Based on the technology application criteria thus developed, appropriate NAMA technology options were identified as shown in table 2:



Table 2: Appropriate NAMA technology options for landfill sites (excerpt<sup>3</sup>)

No	Landfills	Location		Proposed technology			
		Hamlet/district/commune	City/Province	Aerobic treatment (composting)	Incineration for power generation	LFG capture and flaring	Semi-aerobic landfill technology
1	Đam Bri Landfill site	Hamlet No 10, Đam Bri-Bao Loc city	Bao Loc				
2	Khanh Son Landfill site	Hoa Khanh Ward, Lien Chieu District	Đa Nang				
3	Dinh Vu Landfill site	Dinh Vu, Hai An District, Hai Phong	Hai Phong				
4	Trang Cat Landfill site	Trang Cat, Hai An District, Hai Phong	Hai Phong				
5	Phuoc Hiep - Cu Chi Landfill site (No 2)	Waste Treatment Complex in Phuoc Hiep - Cu Chi	Ho Chi Minh City				
6	Phuoc Hiep - Cu Chi Landfill site (No 3)	Waste Treatment Complex in Phuoc Hiep - Cu Chi	Ho Chi Minh City				✓
7	Luong Hoa Landfill site	Luong Hoa, Vinh Luong commune	Nha Trang City				
8	Ru Ri open dump site	Vinh Luong commune	Nha Trang City				
9	Phu Ho Landfill site	Zone No 3, Phu Ho Commune, Phu Tho	Phu Tho				
10	Tam Nghia Landfill site	Tam Nghia commune	Quang Nam				

[Note: The cells colored in orange indicate appropriate technology options according to the technology application criteria]

Table 2 illustrates that only one technology option was identified as appropriate for most landfill sites, whereas more than one technologies options were found to be applicable to some landfills, including, for instance, the landfill Phuoc Hiep- Cu Chi (No. 6 in the table). To determine only one technology option for such landfills, an economic criterion – an additional criterion for technology selection – was adopted. The principle of the economic criterion is simple: if multiple technology options are applicable, the cheapest option is to be selected. Of the four NAMA technology options, the most economical one is arguably semi-aerobic landfill technology, followed by composting, LFG capture and flaring, then incineration. Hence, as shown in Table 2, semi-aerobic landfill technology was selected as the NAMA technology option for the landfill No.6.

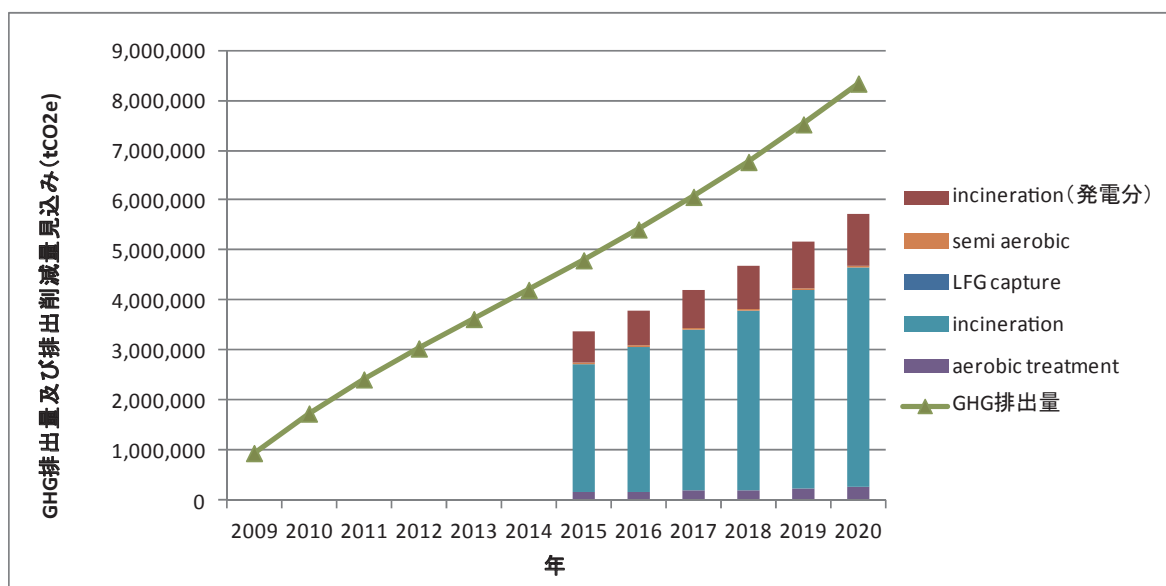
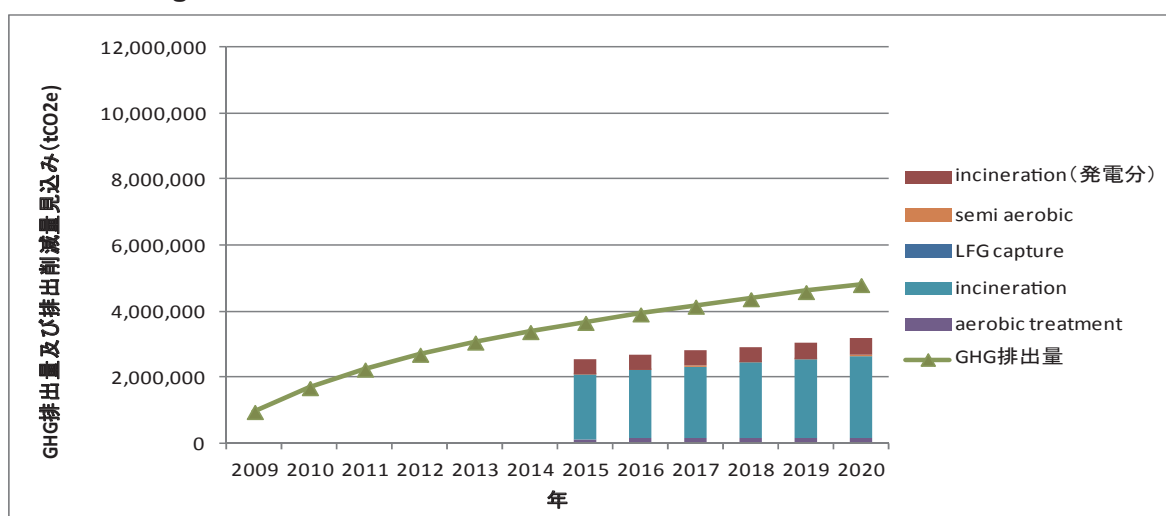
Additionally, because it is not economically feasible to introduce new technologies to all the landfill sites at the same time in a given year, it was decided that NAMA technology options would be introduced to only those URENCOs that answered that they would like to introduce new technology for solid waste treatment within three years. Given the argument above, it was decided that the four NAMA technology options would be introduced as follows: 1) composting: 7 landfill sites; 2) incineration for power generation: 7 landfill sites; 3) LFG capture and flaring: none; and 4) semi-aerobic landfill technology: 2 landfill sites.

<sup>3</sup> As noted above, a total of 73 landfill sites were examined in the study; this table shows only 10 of them as examples.

## Estimation of GHG emissions reductions with the introduction of four NAMA technology options up to the year 2020

Based on the results of the NAMA technology selection process outlined in section 4 above, the aggregated amount of GHG emission reductions was calculated, assuming that the NAMA technologies would be introduced in the year 2015. In terms of the methodologies, two relevant methodologies of the Clean Development Mechanism: AMS-III.F. ver. 7.0 (Avoidance of methane emissions through composting) and AMS-III.G. ver. 8.0 (Landfill methane recovery) were referred to, in addition to the 2006 IPCC Guidelines. Figure 3 shows the results of the calculations in Scenario 1 and Scenario 2.

Figure 3: Estimated GHG emissions reductions in the two NAMA scenarios



In both of these figures, the light green polygonal line shows the total GHG emissions from the landfill sites managed by URENCOs, while the bars represent the estimated GHG emissions reductions, with each color representing the effects of the respective NAMA technology options. As shown in Figure 3,

the total GHG emission reductions in the waste sector of each year in period 2015-2020 could be much lower than the BAU in both scenarios. The total GHG emission reductions of period 2015-2020 are expected to reach almost 8.5 million tCO<sub>2</sub>e in Scenario 1 and approximately 12 million tCO<sub>2</sub>e in Scenario 2.

## Conclusions: Lessons learned and way forward

In conclusion, the URENCO questionnaire survey proved to be very useful in developing the NAMA technology application criteria. And thanks to the valuable insights gained from the survey into the situations of individual landfill sites in Vietnam, it was possible to identify waste treatment technologies appropriate for each of them and develop the NAMA scenarios accordingly. The survey also revealed, however, some remaining challenges to overcome to further refine the NAMA scenarios in the future. The largest challenge in this regard is the fact that no systematic data management system had been established at some of the URENCOs that had responded to the survey. For this reason, key data was missing from their responses, which could have complemented other existing data sources. Therefore, sound data management systems should be established at the URENCOs, ideally supported by a strong political will, along with appropriate institutional arrangements and adequate capacity building. Finally, it should be also noted that privatization of waste collection/disposal services began a few years ago in Vietnam. Thus, solid waste management has partly become an issue outside of the public realm. A prime example that illustrates this privatization trend is the fact that the URENCO of Ho Chi Minh City – the largest city and commercial capital of the country – started reporting significantly less amount of solid waste compared to the preceding years. A significant portion of the solid waste generated in Ho Chi Minh City is collected and disposed of by private contractors without a chance to appear in the official statistics. Therefore, sound data management systems are necessary not only for the URENCOs, but also for these private waste management companies. A remaining challenge for Vietnam is to establish a comprehensive database encompassing data of both the public and private actors of solid waste management.

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## 6

## How to upgrade from a PoA to a NAMA? The case of clean cooking in Peru

By | Arthur Laurent, Microsol<sup>1</sup>

### Introduction

Although Peru has seen a recent time of sustained growth, millions of Peruvians still face difficult conditions of lack of access and opportunity. This structural poverty includes lack of access to clean energy as more than 2 million families still cook with biomass with poorly efficient and highly contaminating stoves.

Such an issue is now greatly acknowledged over the world where a total of 3 billion people face similar situations with significant negative consequences on health among other aspects. Indeed, the World Health Organization has identified indoor air pollution as number 4 in the list of contributors to the global disease burden<sup>2</sup> and is claimed to be responsible for 4 million annual deaths.

This major public health issue requires massive intervention programs which are at the core of attention of an increasing number of both private and public institutions gathered, among other institutions, within the Global Alliance for Clean Cookstoves (<http://www.cleancookstoves.org/>). China, India, Kenya are some example of massive strategies for implementing improved cookstoves but Peru has been one recent sui-generis example. One of its specificities lies in an original public-private partnership based on results with the use of carbon financing. As a matter of fact, a voluntary PoA using the Gold Standard for certification has been implemented that was the first ever voluntary PoA to register and the first PoA ever to issue credits.

This initiative has been led by Microsol (<http://www.microsol-int.com/>), a social-business that supports climate mitigation projects with high social and economic benefits for the poorest by giving these projects a streamlined access to results based finance mechanisms such as climate finance. The “Qori Q’ oncha”<sup>3</sup> program implemented in Peru since 2007 now includes more than 100,000 families within an installation - follow-up - maintenance - spare parts replacement and project extension virtuous cycle. Over the years, 3 VPAs<sup>4</sup> including 8 implementing organizations have been registered and three

<sup>1</sup> Associate PhD at Sciences-Po CERI, CNRS. I would like to thank Claire Cuisset, Jiro Ogahara and Nadia Wagner for their useful comments. The views here expressed are my own.

<sup>2</sup> Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2013;380(9859):2224–60.

<sup>3</sup> Jenk M, Laurent A, Raguénès P, Schmitt T, “PoA Practible Insight” , 2010 available at [http://ch.myclimate.org/uploads/media/PoA\\_Practible\\_insight.pdf](http://ch.myclimate.org/uploads/media/PoA_Practible_insight.pdf)

<sup>4</sup> Voluntary Programme Activity, the equivalent of CPAs but on the voluntary market.

successful verification undertaken under the Voluntary Gold Standard. Thus, more than 400,000 CO<sub>2</sub>eq tons have been reduced and over EUR 5 million in climate financing directly used for these activities.

**Table 1: Progressive installation and voluntary emission reductions Gold Standard PoA**

Year	2008	2009	2010	2011	2012	2013*
Number of Improved Cookstoves - cumulated	7,059	23,816	40,871	66,539	97,726	106,056
Amount of Emission Reductions - cumulated	1,049	16,325	62,795	188,455	395,574	490,655

\*The crediting period ended on May the 13<sup>th</sup> 2013.

Microsol's model for managing voluntary PoAs open to all actors implementing clean technologies is currently being replicated in Central America. The "Ustil Naj" program is finalizing registration and allows for both improved cookstoves and water filter projects in Peru, Mexico, Salvador, Honduras and Guatemala to receive the Gold Standard certification. The current first generation of projects (a set of 4 VPAs and 11 organisations) considers about 20,000 families in four countries and the potential is at least 1 million more.

The work of Microsol has been led in close collaboration with partnering institutions such as ITYF<sup>5</sup> and their acclaimed Sembrando Programme among other NGOs as well as with several Peruvian regional governments thanks to the support of GIZ and UNDP. Also, a close coordination has been maintained with other related initiatives driven by cooperation bodies and the state.

The current stage of the discussion in Peru is related to the possibility of structuring a sector wide strategy with multiple integrated activities that accounts for the greenhouse gases emission reductions it allows. This paper discusses the main features such a strategy could have with basis on the experience already developed. It only presents the personal opinion of the author who was involved in the design and operation of the carbon accounting program for stoves in Peru named "Qori Q'oncha" .

## The issue of clean cooking in Peru

2 million families are reported to require a clean and efficient cooking solution in Peru. To date, more than 250,000 biomass improved cooking devices have been implemented among which over 100,000 have been registered under a carbon program. More recently, after a governmental change, a massive gas subsidies and gas-stove diffusion program led by the government claims to have attended over 500,000 households. Although this program has been quite successful in terms of implementation, first evaluation surveys show that about 92%<sup>6</sup> of these families have been identified to keep on using the traditional biomass stove.

One core lesson suggested by this experience is that private and public initiatives can both be integrated and complementary. The change of focus from biomass to gas stoves presents an interesting opportunity for upgrading stove quality. Yet, the current power of purchase of the poorest does not ensure they will be able to sustain this change over time. This can be one of the reasons why most of

<sup>5</sup> Source: Instituto Trabajo y Familia, [http://www.ityf.org.pe/index.php?fp\\_idioma=ENG](http://www.ityf.org.pe/index.php?fp_idioma=ENG)

<sup>6</sup> Source: [http://www.minem.gob.pe/\\_detallenoticia.php?idSector=12&idTitular=6433](http://www.minem.gob.pe/_detallenoticia.php?idSector=12&idTitular=6433)

the beneficiaries of this program continue using biomass burning stoves for which the previous focus on improved biomass stoves is more adapted.

A global vision needs now to be strengthened at national level for how to effectively and efficiently integrate both dimensions. In particular, it should clarify whether the focus for gas stove diffusion is made with families with some power of purchase while the diffusion of biomass improved cookstoves is aimed at the poorest. Moreover, more details should be given on how to ensure an adequate exit strategy<sup>7</sup> from the subsidies program so as to ensure the durability of the sector.

In order to adequately design a sectorial approach for clean cooking, the following questions need to be answered:

- Should the sectorial approach integrate gas and biomass based- solutions?
- It is possible to combine subsidies and market approaches for clean cooking solutions?
- How to segment the need for fuel, the need for a cooking device and the need for spare-parts for the cooking device?
- Then, how to segment the needs according to the purchasing power?

## Improved MRV

Concerning how to account for the GHG emission reduction results under the improved cookstoves programme in Peru, a methodology developed by the Gold Standard and increasingly acknowledged under the UNFCCC has been used. It is based on kitchen surveys and tests implemented within the houses of a representative sample of stove users.

First, a qualitative survey is implemented in order to identify the fuel consumption profiles within the population. Then, the evolution of wood consumption from the initial device to the new device has to be quantitatively evaluated for each one of these different profiles. A sufficient amount of wood for one week use needs to be gathered and weighted. The remaining amount of wood is then weighted three days later so as to calculate the daily consumption.

A nation-wide campaign for training stove testers has been implemented with sessions implemented for an average of 20 officers each time. At the end of the training, these officers need to go through an examination of their understanding of the content of the training so they can be allowed to conduct the tests. Also, their actual in-field performance is evaluated and this overall information is centralized.

Throughout the years, the sampling method, the calculation and the questions used in the surveys have been modified constantly so as to improve the accuracy of the MRV system. The use of tablets for gathering the information has been supported as a way to reduce errors. Also, customized software has been created so as to ensure a proper data treatment and so as to make quality control and data presentation easier and less costly.

The monitoring implemented has shown that GHG emission reductions - instead of decreasing because the device becomes less efficient - may actually increase if adequate training and follow up is made

<sup>7</sup> Simon G., Bailis R., Baumgartner J., Hyman J., Laurent A. "Assessing The 'Tipping Point': A Review Of Current Debates And Future Research Needs In The Clean Cookstoves Sector" , Energy for Sustainable Development, Volume 20, June 2014, Pages 49-57



with the stove users. This observation supports the usefulness of coordinated sector wide follow-up and maintenance activities that would reveal this potential for high wood savings. Also, and this became all the more true as a major gas initiative has been implemented, stacking – that is continuous use of several devices at the same time - is generality rather than exception<sup>8</sup> and thus eligibility criteria, methodologies and MRVs should be adapted.

In order to continue upgrading the MRV system and adapt it to a sector wide strategy, the following questions need to be answered:

- Can standard MRV(+) tell us more than “how much?” but also “why?”
- Can an MRV also account for activities that would increase the emission reductions not only through retrofitting but also through users capacity building. These could potentially be implemented in parallel to implementation activities and eventually by different organizations?
- Can one MRV(+) count for multiple complementary devices?

## Financing

Concerning financing, a combination of in-kind and cash payments by the user and public and private sources has been used for the initial investment in cookstoves installation. While in a first place most of the support came from important international foundations, private companies and international cooperation the public sector has then shown a remarkable involvement.

The central government for example has been involved with the installation of several tens of thousands of stoves both gas and biomass in a context of kerosene ban in order to fight against drug trafficking. Then during the following mandate, centralized funding has been used for the massive gas stove diffusion programme and, to some extent for a minor cookstove programme.

At a regional level, governments have been able to use their own budget for financing improved cookstoves thanks to a decree signed by the President. In some cases the management of the funds has been commissioned to the UNDP in a context where own funding by regional governments is increasing but there is still a lack of capacity and transparency in its management.

As far as climate finance is concerned, the rewarding of the projects results in terms of social, economic and environmental benefits mainly came from private CSR commitments. The exceptional quality of the project, its capacity to deliver a high number of credits from a cookstove programme, and its focus on the poorest families in the country have been convincing selling points.

Yet, now that the programme has come to its full pace, it delivers an important amount of credits. Also, as cookstoves are increasingly acknowledged for their multiple benefits, large investors coming with short term repayments objectives have entered the place resulting in increasing and often low quality competency. The programme appears now as a one of its kind large-scale “boutique” project and volume becomes counter-productive for results based finance.

<sup>8</sup> Ruiz-Mercado I, Masera O, Zamora H, Smith KR. Adoption and sustained use of improved cookstoves. Energy Policy 2011; 39(12):7557–66.

It will thus be a key issue, for a proper ambitious results based financed scheme to work, to be able to differentiate high and low quality projects one from another. Alternative measures need to be put in place in order to fully acknowledge for the co-benefits potential of this project<sup>9</sup> beyond typical large scale projects.

Thus, the following questions need to be answered:

- Can (should?) co-benefits be monetized?
- Can we complement climate results based finance with health results based finance?
- Should microfinance, private banking and the climate fund enter the equation?

## Sustainability

Such a need for differentiating the project is closely related to the sustainability issue. We need to be able to demonstrate that financing a project that lasts 2 years is not the same as financing a project that lasts 10 to 30 years. For example, a PoA is set to last 30 years and it should get a premium for that. When planning for a thirty years plan in implementing clean stoves, new concerns arise that are not taken into account in most of the large scale project.

Such is the case of follow up, maintenance and progressive extension of the programme. It has been demonstrated that, if improved cookstoves are easily adopted in a first place, they also very easily get abandoned after the first year. In order to be able to identify and solve this issue in Peru, mixed methods (anthropological, qualitative and quantitative) have been implemented for understanding adoption and designing adequate strategies.

What we have learned is that qualitative surveys at a household level with a limited number of families can usefully inform quantitative ones and giving a more precise picture of the situation. Yet, sustainability happens not only at a household level. Institutional, technical and sector wide strategies are necessary for complementing field work.

Numerous successes in terms of institutional and technical aspects have already been achieved at a sectorial level but they still lack continuity. For example, a Peruvian technical norm has been defined that faces quality and, more recently, security issues and a national body has been designed for certifying the clean cooking devices accordingly. Also, an informal intra-sectorial coordination group does exist but with no specific strategic agenda.

It is now a key issue for transforming coordination into cooperation and ensure that an inter-sectorial approach does not dilute the issue or delay solutions but on the contrary streamlines the process.

As a consequence, the following questions need to be answered when thinking about a sector wide strategy for sustainability:

- Can we get a premium for sustaining results over time?
- Can we integrate adoption and carbon objectives?

<sup>9</sup> Simon G, Bumpus A, Mann P. Assessing win-win scenarios at the climate-development interface: challenges and opportunities for cookstove replacement programs through carbon finance. Glob Environ Chang 2012;22:275-87.

- What kind of governance should be set in place in order to accelerate an existing public-private dynamic?
- Can a mix of public and private leadership be acknowledged under a NAMA?

## Conclusion

As a conclusion, there is a great potential for scaling up clean cooking activities in Peru and much of the elements that constitute a sectorial approach are already in place yet they need to be integrated. Until now, the stress was put on raising awareness, supplying the poorest and sustaining results but there is now a need to formalize a sectorial strategy that would allow scaling up.

And there is significant potential. The current PoA shows that one family changing from a traditional stove to an improved cookstoves can reduce above 2 CO<sub>2</sub>eq tons per year. Considering the current actors in place are able to implement rather easily about 100,000 units a year, there is possibility for a reaching one million stoves within ten years generating an annual reduction of a minimum of 2 million CO<sub>2</sub>eq.

**Table 2: Projection of cumulated stove installation and voluntary emission reduction under a NAMA**

Year	2016	2017	2018	2019	2020	-> 2025
Number of Improved Cookstoves - cumulated	100,000	200,000	300,000	400,000	500,000	1,000,000
Amount of Emission Reductions - cumulated	200,000	400,000	600,000	800,000	1,000,000	2,000,000

In this context, a NAMA seems particularly adequate as it represents a tool for the formal definition and coordination of the sectorial objectives already informally set within a lively, clean cooking sector in Peru. It should build on existing efforts for a prompt start and quick results. After COP20, the Peruvian government is now leading an effort for initiating a national NAMA registry that should make the communication and discussion easier.

So, in terms of construction, besides financing, the main challenge resides in having a true genuine ad-hoc sectorial dynamic being recognized as legitimate for leading a new NAMA rather than adopting top down approaches that would reinvent the wheel. If one learning is to be taken out of this example it is the following: the more advanced the coordination between actors at a sectorial level, the more legitimate it is to upgrade to a NAMA. In this regard, those PoAs that have an architecture that shows the wider understanding of their sectorial role rather than to support specific actors may have the biggest potential for upgrading to NAMAs. An adequate screening of currently working PoAs should allow for understanding which are ready for an upgrade or not.

Finally, as inequalities are increasing and climate finances is delayed to flow towards most vulnerable countries and communities, there is a great need for tools that would prioritize NAMAs with high poverty alleviation potential. Both the UNDP<sup>10</sup> and the Gold Standard are now offering to certify the sustainable

<sup>10</sup>UNDP 2014, Nationally Appropriate Mitigation Action (NAMA) Sustainable Development Evaluation Tool, available at <http://www.undp.org/content/undp/en/home/librarypage/environment-energy/mdg-carbon/NAMA-sustainable-development-evaluation-tool.html>

development benefits efforts of NAMAs certification which represent an interesting tool. Yet, in the end, the demand for such credits or the availability for adequate other forms of finance remain the key aspect for being able to climb up the not so high but still challenging step from a PoA to NAMA.

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## 7

## Developing countries are taking the lead in climate change mitigation through NAMAs

By | James M. Vener, Low Emission Capacity Building (LECB) Programme, UNDP

## Introduction

Following the climate change negotiations associated with the 2007 Bali Action Plan, the 2010 invitation for countries to communicate nationally appropriate mitigation actions or NAMAs, through to the 2012 agreed-upon outcomes pursuant to the Bali plan, little concrete official instruction on NAMAs has been provided for policymakers. UNFCCC, various donor organizations, technical organizations, and numerous others have offered valuable technical and financial assistance, but it has been the developing countries at the forefront of developing innovative NAMA designs and testing the waters in the new climate finance markets.

The United Nations Development Programme or UNDP is the largest service provider in the UN system on climate change mitigation and adaptation. The Low Emission Capacity Building (LECB) Programme, implemented in partnership with the European Commission, Germany Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), and Australian government, is

one such initiative that places its focus on climate change and targets sustainable development through NAMA development.<sup>1</sup> UNDP's pool of NAMA and carbon project experience is also complemented by practical know-how gained through the MDG Carbon Programme.

Since 2011, the LECB Programme has joined forces with 25 developing countries worldwide to support national development plans while helping to integrate low-carbon and sustainable development goals. Our projects in each partner country are country-driven. Government partners receive support from the Programme based on national priorities and capacities, and work with UNDP to construct a tailored country program that can consist of the following five complementary work streams: (i) identification of NAMA opportunities; (ii) design of low emission development strategies (LEDS); (iii) design of MRV systems for the NAMAs or LEDS; (iv) development of greenhouse gas (GHG) inventory management systems; and (v) forging relationships with the private sector such as through public-private partnerships. The Programme spans Latin America, Africa, Asia + Pacific, the Middle East, and Eastern Europe, and is flexible in terms of sectors supported and what is most nationally appropriate, such as agriculture, energy, forestry, industry, transport, and waste management.

In the past four years, the LECB Programme has gained a great deal of experience in NAMA practices that have been successful, encountered challenges, and created opportunities. Our work has led to the building of institutional foundations, technical and financial trainings, design of over 60 NAMAs to various stages in the NAMA cycle, as well as six LECB countries submitting NAMAs to the NAMA Facility<sup>2</sup> for support. It is UNDP's intention with this report to discuss these experiences and highlight innovations and lessons learned through real-world case studies and hopefully offer inspiration.

## NAMA Design

At the core of the NAMA concept is national appropriateness, where emission reductions are under the umbrella of a national government initiative<sup>3</sup> that helps to assure national ownership. A NAMA must include several interrelated elements that together form an integrated mitigation strategy: the concept must be technologically and financially viable; there must be institutional buy-in; a reliable and efficient MRV system that accounts for measurement, reporting, and verification; involvement by and support from key stakeholders; and a proponent or champion to steer the NAMA concept through from planning through the implementation stage.

In light of the complexity of developing these interconnected components and relative newness of the NAMA concept, costs are typically high in terms of expense, time, and human resources for a developing country to create an advanced NAMA concept. This is particularly a restraining factor as resources inevitably are limited.

One of the earliest steps of NAMA development is identification of NAMA options and prioritization. The design process will consider: what are key target sectors, how best to leverage public funding in the private sector and build public-private partnerships, financial and non-financial barriers to be addressed, and other primary concerns such as jobs, investment targets, mitigation, and alignment with national development goals and sustainable development objectives. Many of these concepts are elaborated in

<sup>1</sup> [www.lowemissiondevelopment.org](http://www.lowemissiondevelopment.org)

<sup>2</sup> [www.nama-facility.org](http://www.nama-facility.org)

<sup>3</sup> <http://unfccc.int/focus/mitigation/items/7172.php>

the 2013 NAMA Guidance Document sponsored and developed by UNDP, UNFCCC, and DTU<sup>4</sup>.

For the LECB Programme, NAMA support typically begins with assisting governments to determine principal areas of interest through extensive stakeholder consultation at the national, regional, and local levels, by reaching out to government, communities, civil society, the private sector, and other experts like institutions. Depending on the initiative, outreach and awareness raising, skills training, and collaboration with the financial sector can also be critical. The latter is especially relevant when considering new market development, micro-finance, and financial mechanisms (e.g., sharing risk, concessional loans, and partial loan guarantees).

Achieving substantive buy-in from critical sectors and promotional activities to garner support (e.g., via in-person meetings, internet, print media, social networking, and community events) can be pivotal as well. NAMAs must be developed with its key stakeholders in mind. As an example, for the LECB Programme in Costa Rica<sup>5</sup>, the primary driver for the livestock sector NAMA is economic benefits and improvements to farm productivity, and in this instance, while GHG reduction potential is high, GHG mitigation is less critical. In Chile, in an effort to inform the private sector about NAMA opportunities, a regional conference was coordinated in May 2014 on engaging the private sector to contribute to mitigation to a very positive response and 200+ participants. The Malaysian government concentrated much of its NAMA efforts on registering NAMAs for recognition or acknowledgement, rather than for seeking financial support to help raise credibility and institutional comfort levels in the NAMA process.

Bhutan<sup>6</sup> has chosen to focus on NAMA development in the context of the overarching goal of carbon neutrality with priority placed on analyzing gender issues in the housing, transport, and waste sectors. Sectoral assessments used in the LECB Programme in Egypt and Vietnam were quite effective as well for supporting identification of feasible mitigation or NAMA opportunities with high GHG emission reduction potential and stakeholder support. The assessments also served to enhance communication between government and the private sector, and lent to the discussion on how the private sector can contribute to national mitigation goals.

When developing NAMAs and trying to attract investment, it is imperative to limit costs where possible and to take advantage of existing systems rather than reinventing the wheel. For example, the LECB Programme includes parallel tracks that address GHG inventory development, MRV system development, and stakeholder outreach, and all of these components have opportunities for cross-over with NAMAs. For example, GHG emission reduction data is an essential component of NAMA delivery on mitigation targets, the Republic of Moldova used its Technology Needs Assessments developed during a prior programme with UNEP as a basis for NAMA development with LECB, Philippines paired LECB support with USAID in the development of a national inventory system, and Mexico conducted extensive training with industry personnel in GHG inventory reporting and is revisiting these relationships to pilot a cogeneration mitigation project.

For all the possible complexity and overlap of responsibilities between institutions, NAMAs operate

<sup>4</sup> UNFCCC, UNDP, DTU (2013) Guidance for NAMA Design: Building on Country Experiences, [http://www.lowemissiondevelopment.org/docs/resources/Guidance\\_for\\_NAMA\\_Design\\_2013\\_.pdf](http://www.lowemissiondevelopment.org/docs/resources/Guidance_for_NAMA_Design_2013_.pdf).

<sup>5</sup> [www.lowemissiondevelopment.org/docs/case\\_study\\_pages/Costa\\_Rica/Visibility\\_Case\\_Study\\_Costa\\_Rica\\_Final.pdf](http://www.lowemissiondevelopment.org/docs/case_study_pages/Costa_Rica/Visibility_Case_Study_Costa_Rica_Final.pdf)

<sup>6</sup> [www.lowemissiondevelopment.org/docs/case\\_study\\_pages/Bhutan/Visibility\\_Case\\_Study\\_Bhutan\\_final.pdf](http://www.lowemissiondevelopment.org/docs/case_study_pages/Bhutan/Visibility_Case_Study_Bhutan_final.pdf)



better if they are nimble. All LECB NAMA projects incorporate an element of periodic self-evaluation because NAMAs must adapt when conditions change. The evaluation should be comprehensive and consider staffing and data needs, the budget, and if objectives are realistic and can be delivered in an efficient and transformative way. The LECB project in China<sup>7</sup> is not a NAMA but it is a government-sponsored mitigation project, and it is a good example of making technical adjustments in the field: the China team determined that for the production line and grinding mill of the element of the cement sector in question, emission measurement methodologies were deemed more accurate for some product parts than others so specific distinct accounting processes were recommended.

## MRV

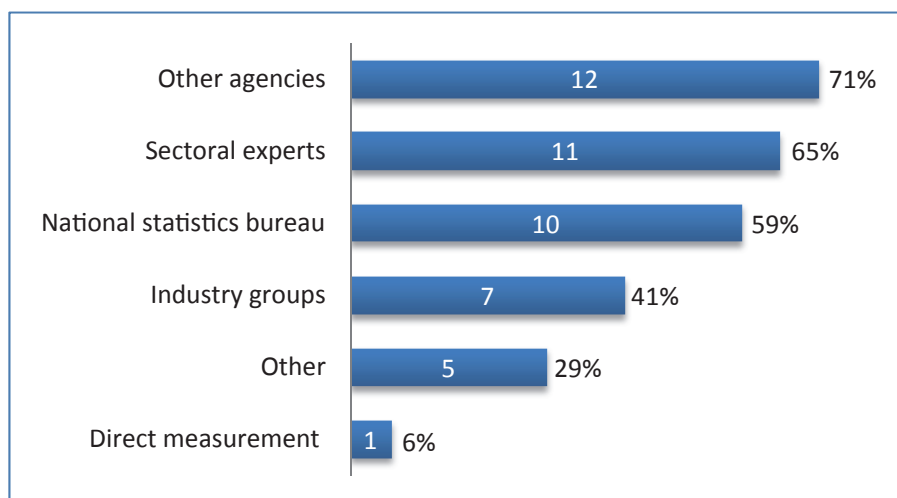
Robust and efficient MRV systems are needed for NAMAs to reflect progress made in reducing GHG emissions, non-emission impacts, and/or the flow of financial support. Designed well, these systems can raise confidence in NAMA operations in terms of accountability and credibility, and potentially help attract finance. MRV should also provide open and transparent data access (e.g., for investors and beneficiaries) and encourage participation and interest. Without UNFCCC methodologies put forward on MRV, countries have borrowed experience from mechanisms such as the CDM (clean development mechanism) and Gold Standard, and guidelines provided through GHG inventory reporting (National Communications and Biennial Update Reports), the IPCC, and GHG Protocol. A well-designed MRV will also enable countries to meet international reporting requirements, inform countries on their emissions, and support policymakers with accurate and timely data to develop such tools as Mitigation Action Plans (MAPs) and intended nationally determined contributions or iNDC.

LECB provides MRV training, engages sectoral and local experts to help develop MRV systems, and conducts MRV readiness testing. Testing typically consists of checking data flow and infrastructure, governance, selection of indicators to measure (e.g., job creation, health improvements, and pollution reduction), quality assurance and quality control (QA/QC), reporting schemes, and recordkeeping.

As part of UNDP's periodic internal review of the LECB Programme, a third party expert was contracted to analyze the status of MRV systems set up or still under development. A questionnaire was circulated to national focal points involved with NAMA development in the LECB partner countries, 18 responses were received, and field visits were conducted. Notably, we found that 41% of MRV systems are multidimensional that track more than just GHG emissions (e.g., energy consumption and socio-economic indicators), and a surprisingly small percentage of respondents indicated existing data is used from national statistics bureaus, other agencies, and sectoral experts, while only 41% use data from industry groups (see Figure 1). With resources limited, more work is needed to reach out to relevant sectors to identify and collect readily available data.

<sup>7</sup> [www.lowemissiondevelopment.org/docs/case\\_study\\_pages/China/Visibility\\_Case\\_Study\\_China\\_Final.pdf](http://www.lowemissiondevelopment.org/docs/case_study_pages/China/Visibility_Case_Study_China_Final.pdf)

Figure 1: Existing Data Sources used by Countries for MRV Systems



NOTE: Values represent the number of respondents who reported using each data source, and percentage of the total

Acknowledging the trade-off between data collection and cost, MRV systems should have a clear objective and target collecting only data that is needed. The system should be easy-to-understand, minimize inter-agency communication that could add complexity, and provide clear instructions and allocate roles and responsibilities. A high 82% of LECB partner countries reported MRV is being implemented by multiple agencies rather than a single entity. Although this decentralized approach requires additional coordination and capacity building, the opportunity for improved communication and compilation of high-quality data was chosen to take priority.

QA/QC and verification were found to be lower priorities in MRV systems. UNDP recommends QA/QC backstopping systems are strategized early in the NAMA process, and they can be relatively simple in the beginning. For example, basic QC checks can include confirming formulas for emissions calculations are correct, checking for errant data in data sets, and checking data against historical data trends. Verification is likely being left for later stages of NAMA development but it would similarly benefit from early consideration to analyze places along the NAMA project or programme chain where verification would be optimal, and to identify possible third party actors to fill the role. Starting with perfect processes is not critical as the MRV system should be a work in progress.

Legal arrangements govern the various elements of the MRV system. Although a strong legal and regulatory framework can add to credibility, enforcement, and political incentive for stakeholders to buy-in to a new data management system, the broad political support required might not be available. In this instance, a potentially valuable alternative might be a non-legislative, executive-level order from a president, minister, etc. These are typically not as strong or enforceable for a compliance system; however, they can be more direct and faster to establish. Lebanon, for example, developed executive-level orders that provide the Ministry of Environment the authority to collect data from commercial, industrial, and institutional entities, and it provides the Ministry a stronger mandate to collect data. To ease reporting, a tool was designed to encourage participation that provides reporting actors with information that potentially has value for their operations.

Furthermore, to help political leaders attract support for mitigation and be in-line with national

development strategies, indicators for MRV should be selected to support areas of personal interest to political leaders (e.g., job creation, attracting investment, lower levels of pollution). As with Lebanon, MRV requirements should not be overly burdensome. In the Philippines, the Environmental Management Bureau added GHG emission reporting to pre-existing self-monitoring reporting requirements, which is a system the reporting entities are comfortable with. Governance is another main driver of the NAMA system discussed in the next section that addresses improvements in efficiency in the context of management.

## Institutional Arrangements

The NAMA concept is flexible in scale. It can pertain to legal or regulatory policies, national declarations to mitigate GHG emissions, or individual actions or groups of actions that contribute towards national mitigation objectives. In terms of governance, a NAMA coordinating entity(s) is needed to legislate, plan, and manage activities and coordinate with other agencies. To minimize overlaps in ownership of the NAMA process, countries can arrange to have a single central domestic entity to coordinate NAMA-related activities or multiple entities might be more appropriate.

The office of the NAMA coordinating entity should conduct or oversee the following: (i) track financial resources, (ii) be involved in and oversee all stages of the NAMA (e.g., prioritization and selection, design, implementation, and MRV), (iii) conduct stakeholder coordination, (iv) streamline operations and centralize the NAMA process, and (v) provide guidance on the NAMA process. For MRV, data system oversight can be centralized under a single institution in a top-down manner or be bottom-up with more authority in the hands of data collectors. Reporting can be bottom-up as well, or part of an integrated national system.

To establish more efficient oversight within the government, Tanzania set LECB project coordination responsibilities within a centralized Vice President's Office. Indonesia went in the other direction by facilitating provinces to develop 33 local action plans in line with its national action plan to identify priority mitigation actions. Indonesia action plans are reviewed by line ministries, supervised by the Ministry of Environment, and the overall NAMA process is coordinated by the Ministry of National Development Planning or Bappenas to ensure NAMAs are in line with national development planning priorities.

Based on observations since LECB Programme operations began four years ago, the following elements of institutional coordination have been observed to be crucial: (i) extensive coordination between stakeholders, ministries, and private actors, (ii) minimized conflicts of interest, (iii) clearly defined roles, and (iv) political commitment and alignment with national priorities. To attract political support, it is advisable to consider prioritizing attracting investment and other commercial interests, targeting priority sectors and ministries, and creating jobs. In addition, a legal basis that outlines clearly roles and responsibilities could improve credibility, make the system seem less ambiguous, and incentivize participation. For example, a formalization of arrangements between agencies like a MOU could stipulate that data is provided in a specified format.

Another recommendation based on LECB Programme experience on-the-ground is to establish inter-ministerial bodies, sectoral working groups, and steering committees (e.g., for NAMAs, MRV, and GHG inventory development) to enhance collaboration, political ownership, and more efficient use of

expertise. For example, in Colombia, four distinct Sub-Commissions prepare Low Carbon Development Strategies for climate change mitigation and adaptation and oversight is performed by the Financial Committee and Climate Change Executive Commission, and the lead role is played by the National Planning Department. Kenya's focus in the LECB Programme has been to engage and build capacities of government institutions to standardize a system of data collection, documentation, and archives associated with the national GHG inventory process.

Similar to the survey of LECB partner countries on MRV capabilities, LECB also circulated a survey regarding institutional arrangements to LECB partner country representatives that work with NAMAs to investigate country approaches, innovations, and possible bottlenecks, and barriers for establishing a strong framework for NAMA management. The greatest bottlenecks were determined to be the lack of institutional capacity and the lack of a clear mandate and roles for institutions to lead on NAMAs so this is a recommended focus. The survey also revealed that over half of the countries responding indicated the CDM structure proved to be quite useful as a model for NAMAs. The CDM structure's Designated National Authority (DNA) office and GHG reporting framework are therefore important foundations that can be used as a NAMA starting point.

For more in-depth analysis of two LECB partner country experiences, case studies for Costa Rica and Zambia are provided after the Conclusions section. These and others are posted on the LECB Programme's website<sup>8</sup>.

## Conclusions

In the face of growing urgency to curtail the momentum of climate change, the pace of international negotiations to secure a global means to address the trend is frustratingly slow. Signals are emerging in annual negotiations that a post-2020 climate regime are moving in the right direction, voluntary national and sub-national commitments are emerging to reduce GHG emissions, and the system to scale up access to climate finance via the Green Climate Fund and bilateral funding sources for NAMAs have raised confidence amongst developing countries that the national expenditure of resources to develop NAMA programs and projects is a worthwhile enterprise. The growing global pool of knowledge of NAMA procedures and systems that work, are presenting challenges, and are innovative has added confidence and expertise to national capacities as well.

The LECB Programme has partnered with 25 developing countries to facilitate the alignment of national development plans with their priorities for sustainable development, poverty reduction, and mitigation of GHG emissions. Both LECB and non-LECB developing countries alike are demonstrating the rising interest and capability to strategically place themselves in a position to receive climate finance when and where it is available. They have chosen to push forward with establishing frameworks to develop NAMAs and mitigation action plans and strategies without concrete global guidelines in place, choosing to invest scarce time, money, and human resources to take the lead in climate change rather than follow.

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<sup>8</sup> [www.lowemissiondevelopment.org](http://www.lowemissiondevelopment.org)

## LECB CASE STUDY #1: Costa Rica Livestock Farms NAMA Concept

In Costa Rica, the livestock sector provides employment for over 12% of the nation's workforce based on a recent 2013 survey. Livestock, predominantly meat and dairy cattle, is also the second largest national sub-sector in terms of GHG emissions generation with about 23.6% of national emissions from 45,000 farms based on the last national inventory.

Following the 2007 announcement by the Costa Rican government to become carbon neutral by 2021, the Ministry of Agriculture and Livestock Farming (MAG) prepared the Policy for the Costa Rican Agrifood Sector and Rural Development 2010-2021. In this policy, climate change and agro-environmental management was established as one of the four pillars of national policy to support the carbon neutrality goal. In alignment with this objective, the government decided to develop a livestock NAMA to achieve transformational change in livestock operations and make it eco-competitive.

Laying the groundwork to develop the NAMA concept required extensive collaboration between MAG, Ministry of Environment and Energy, CORFOGA Livestock Corp., and the National Chamber of Milk Producers. Universities, NGOs, regional commissions, and livestock producers all play key roles in a hybrid top-down and bottom-up approach to NAMA institutional arrangements.

**The Vision:** The NAMA targets a more environmentally sustainable, modernized, mechanized, and efficient sector for meat and milk production.



Four primary challenges were identified that could possibly limit the NAMA's transformational change: (i) much data and awareness raising are required by producers to support a change in how they do business; (ii) investment is required, however this is a new lending sector so access to credit is limited; (iii) higher efficiency pasture seeds (e.g., for grasses) have limited availability; and (iv) market demand is limited because of limited consumer awareness of low-emission livestock products.

The NAMA addresses these challenges by transforming the cattle production chain through sustainable practices. The NAMA includes using tree plantations as hedges, herd rotation to limit grazing, better livestock nutrition, and improved fertilizer plans. It serves to provide needed agricultural emission data and emphasizes strengthening capacities and interagency coordination. Market incentives under consideration to bridge the credit gap and low collateral are co-financing, credit guarantees, and favorable interest rates that would be managed by the National Bank. The NAMA also offers eco-competitiveness, GHG emission reductions, and significant co-benefits such as soil conservation, better soil moisture retention, greater farm income, and increased forest cover.

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- INEC (2013). Continuous Survey on Employment

## LECB CASE STUDY #2: Zambia Integrated Waste Management NAMA

Economic and urban growth in Zambia has led to a significant increase in waste generation. Yet, as noted in a recent report by the Ministry of Local Government and Housing, only about 25% of waste generated in the capital was disposed in designated disposal sites. Furthermore, even though households are the largest generator of the waste, less than 10% of residential areas in the country are serviced by managed solid waste disposal sites and, as of 2008, only 16 of the country's 72 districts had licensed municipal waste disposal sites. Recognizing sustainable waste management system as a national development priority, Zambia established the 2004 National Solid Waste Management Strategy and 2010 National Urban Water Supply and Sanitation Program.

Despite awareness of the need to implement a waste system and to maximize the "3Rs" – reduce, reuse, and recycle – adverse conditions created by the current waste management infrastructure are growing worse marked by: littering and indiscriminate dumping, accumulations of uncollected waste, improper handling of hazardous waste, and health hazards such as runoff leading to water contamination. To date, integration of an updated system has been hampered by local authorities with limited financial capacity and staff resources.

In an effort to upgrade the existing inadequate and unsafe disposal systems, the Ministry of Local Government and Housing for solid waste management, National Water and Sanitation Council (NWASCO) for waste water management, commercial utilities, local authorities, and the Zambia Environmental Management Agency (ZEMA) have come together as lead institutions to develop the Integrated Waste Management NAMA.



The proposed NAMA uses a multi-faceted approach for tackling these issues that centers on: (i) public awareness on the need to use disposal sites and maximize waste collection; (ii) technical studies on waste recovery and recycling facility options with emphasis on cost-effectiveness and attracting investment; (iii) policy reform to support the supportive framework; and (iv) capacity building for a wide range of stakeholders from commercial utilities and local authorities to businesses and financial institutions. To assess sustainable development impacts of NAMA activity options during its design stage, an impact assessment tool was used to assign numeric scoring for key indicators.

A primary benefit to the NAMA will be the development of local expertise to establish conditions for continued improvement and technology advancement. This will be complemented by positive health impacts, jobs created in waste plant construction and operation, and GHG emission reductions. Going forward, the NAMA's current proposal will be supplemented by a focus on mobilizing resources and conducting an in-depth feasibility study.

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## 8 Overview of submitted Biennial Update Reports (BUR)

By | Emiko Matsuda, Overseas Environmental Cooperation Center, Japan (OECC)

So far, ten countries have submitted their first BUR by 9 January 2015 (Namibia, Singapore, Vietnam, Chile, South Africa, Andorra (Fr.), the Republic of Korea, Peru (Sp.), Brazil and Tunisia (Fr.))<sup>1</sup>.

According to the UNFCCC guidelines (2/CP.17 Annex III), the seven topics below indicated constitute the scope of information to be included in BUR.

- National circumstances and institutional arrangement;
- National GHG inventory;
- Information on mitigation actions and their effects, methodologies and assumptions;
- Constrains and gaps, related financial, technical and capacity needs, support needed and received;
- Level of support received to enable the preparation and submission of BUR;
- Information on domestic MRV; and
- Other information

### National circumstances and institutional arrangement

Among the information included we can mention the geographical features, and area related information such as water, agriculture, transportation, economy, energy. Some countries included information on country specific issues, such as tourism, mining, waste, housing and so forth. Most of countries described their institutional arrangement in this section, and some countries also mentioned specific organizational structure such as institutional arrangement for GHG inventory/ BUR/NC and domestic institutional arrangements.

### National GHG inventory

The utilized methodology, preparation of the GHG inventory (i.e. quality assurance and quality control), sectoral emissions, key category analyses, time series of GHG emissions, and future plans for enhancement were depicted in most of the BURs.

### Information on mitigation actions and their effects, methodologies and assumptions

Countries implemented mitigation actions through NAMAs, carbon tax, ETS, and multilateral / bilateral international carbon markets. Most of countries summarized their mitigation actions by sectors, and some of them showed each mitigation action in detail. One country also mentioned a NAMA that has not been taken place in the country yet.

<sup>1</sup> [http://unfccc.int/national\\_reports/non-annex\\_i\\_natcom/reporting\\_on\\_climate\\_change/items/8722.php](http://unfccc.int/national_reports/non-annex_i_natcom/reporting_on_climate_change/items/8722.php) (Last accessed in 11/02/2015)

## Constrains and gaps, related financial, technical and capacity needs, support needed and received

Some countries described constraints and gaps in specific contexts of the preparation of GHG inventories, NAMAs and technology issues. A summary or lists of financial support and capacity building received/offered were also indicated. In one case, a prioritized or strengthened sector for capacity building was indicated.

## Level of support received to enable the preparation and submission of BUR

Countries received financial and technical support for the preparation and submission of BUR. Some countries, like Vietnam, included their own effort, supported by bilateral cooperation, in addition to support received from the GEF.

## Information on domestic MRV

Few countries described information on domestic MRV as a stand-alone chapter. A couple of countries integrated this part into the description of mitigation measures. It can be inferred that preparation for MRV is still underway in many countries.

## Other information

Some countries included additional information and efforts taken place in the country in relation to mitigation, adaptation, national/domestic actions.

The table attached to this chapter shows contents provided in submitted BURs sorted out according to the proposed items by the UNFCCC guideline (FCCC/CP/2011/9/Add.1 para. 41 and Annex III)<sup>2</sup>.

<sup>2</sup> GIZ also provided the 'Biennial Update Report Template' which is an informative format for BUR preparation illustrating required data or expected information for each section. <http://mitigationpartnership.net/giz-2014-biennial-update-report-template> (Last accessed in 11/2/2015)



Guideline FCCC/ CP/2011/9/ Add.1 para41 and Annex III	(Executive Summary)	National circumstances Institutional arrangement	National GHG Inventory	Information on mitigation actions and their effects, Methodologies and assumptions
Brazil	N/A	Chapter 1 <b>National circumstances Institutional arrangement</b> 1.1 National Circumstances 1.2 Institutional arrangement	Chapter 2 <b>National Inventory of Anthropogenic Emissions by Source and Removals by Sinks of Greenhouse Gases Not Controlled by the Montreal Protocol</b>	Chapter 3 <b>Mitigation actions and their Effects</b> 3.1 Clean Development Mechanism [CDM] project in Brazil: a brief summary
Tunisia	N/A	Chapter 1. <b>National Circumstances</b> 1.1 The fight against climate change 1.2 Demographic trends 1.3 Economic Situation 1.4 Energy Context  Chapter 2. <b>Institutional Arrangements</b> National Inventory of Gas Emissions Greenhouse	Chapter 3. <b>Comprehensive Income Inventory National GHG 2010</b> 3.1 Results of net direct gas emissions 3.2 Results of gross emissions / removals direct gas 3.3 Results of indirect emissions  Chapter 4. <b>Results Inventory 2010 Disintegrated by Source</b> 4.1 Energy 4.1.1 Analysis of aggregate direct dioxide (CO <sub>2</sub> Equivalent) 4.1.2 Methodologies adopted assumptions and information sources 4.2 Industrial processes 4.2.1 Detailed analysis of the results 4.2.2 Methodologies adopted assumptions and information sources 4.3 The Agriculture, Forestry and Other Land Use (AFOLU) 4.3.1 Detailed analysis of the results 4.3.2 Methodologies adopted assumptions and information sources 4.4 Waste 4.4.1 Detailed analysis of the results 4.4.2 Methodologies adopted assumptions and information sources  Chapter 5. <b>Analysis of Key Categories Inventory 2010</b>  Chapter 6. <b>Trends in GHG Emissions of Tunisia</b>  Chapter 7. <b>Institutional Arrangements for Inventory GHG Policies and Mitigation of Gas Emissions Greenhouse</b>	Chapter 8. <b>Mitigation in the Energy Sector</b> 8.1 Policies and measures initiated before 201 8.2 Policies and measures implemented from 2014 8.2.1 National Dialogue on energy sector 8.2.2 Energy Transition Fund (GTF) 8.2.3 renewable Electricity Act 8.3 ambitious action plan for energy management: impact on GHG mitigation on period 2015-2020 8.3.1 Rational Use of Energy 8.3.2 Renewable Energy  Chapter 9. <b>Mitigation in Other Sectors</b> 9.1 Industrial processes 9.2 Agriculture and forests 9.2.1 The policies and measures implemented before 2014 9.2.2 Policies and measures that may be undertaken from 2014 9.2.3 List of possible options for GHG mitigation 9.4 Policies and measures implemented from 2014 9.4.1 Mitigation in the solid waste sector 9.4.2 Mitigation in the sanitation sector  Chapter 10. <b>Contribution of the Mitigation NANAs GHG Emissions</b> 10.1 NAMA building 10.2 NAMA Tunisian Solar Plan (TSP) 10.3 NAMA sanitation 10.4 NAMA cement 10.5 NAMA forest  Chapter 13. <b>Support Received in the Field of Mitigation of GHG</b> Chapter 14. <b>Context in Connection with MRV</b>  Chapter 15. <b>MRV of Mitigation</b> 15.1 MRV in the energy sector 15.1.1 SIM2E system 15.1.2 EnerInfo system 15.2 MRV planned NAMAs 15.2.1 MRV of NAMA in the renewable electricity sector 15.2.2 MRV of NAMA in the cement sector 15.2.3 MRV of NAMA in the building sector 15.2.4 MRV of NAMA in the sanitation sector 15.2.5. MRV of NAMA in the forestry sector 15.3 MRV CDM projects running 15.3.1 MRV CDM "Recovery and flaring of landfill gas from the discharge Jebel Chekir" MRV CDM "Recovery and flaring of landfill gas from the landfill nine landfills" MRV CDM "Sidi Daoud wind farm" 15.3.2 LWA Bizerte wind farm 15.3.3 MRV Po-A "solar water heater program"  Chapter 16. <b>MRV Support</b>
Peru	Chapter 1 <b>Introduction</b>	Chapter 2 <b>National circumstances and Institutional arrangement</b> 2.1 National circumstances 2.1.1 Profile of Peru 2.1.2 Outline of the population 2.1.3 Weather and geography 2.1.4 Economy and industry 2.1.5 Housing 2.1.6 Specific information of sectors 2.2 Institutional arrangements 2.2.1 Arrangements for the elaboration of the BUR 2.2.2 Arrangements for the elaboration of National greenhouse gas inventories 2.2.3 Arrangements for NAMAs 2.2.4 Arrangements for CDM	Chapter 3 <b>National greenhouse gas inventory</b> 3.1 Methodology 3.2 Summary of national greenhouse gas inventory 3.3 Comparative analysis of national greenhouse gas inventories	Chapter 4 <b>Mitigation measures</b> 4.1 Planning for low-carbon development 4.1.1 Expected and determined national level contributions 4.1.2 Climate change planning project (PlanCC) 4.2 Mitigation measures 4.2.1 Progress of climate change mitigation 4.2.2 Measures for NAMAs 4.2.3 Mitigation projects and programs in the international carbon market 4.2.4 Emission reductions through REDD+

Constraints and gaps, related financial, technical and capacity needs, support needed and recieved	Level of support received to enable the preparation and submission of BUR	Information on domestic MRV	Other information	(Annex and Appendix)	(Additional Information)
Chapter 4 <b>Constrains and gaps, and related financial, technical and capacity needs; Information on support received</b> 4.1 Constrains and gaps, and related financial, technical and capacity needs 4.2 Information on the support received	Chapter 5 <b>Funds received for the preparation of the BUR</b>	Chapter 6 <b>Information on the description of domestic measurement, reporting and verification arrangements (MRV)</b>	N/A	Technical Annex Pursuant to decision 14/CP.19 Results achieved by Brazil from Reducing Emissions from Deforestation in the Amazon biome for REDD+ results-based payments	The BUR was submitted on 31 December 2014
Chapter 11. <b>Financing Requirements of Investments</b> 11.1 Total needs 11.2 Requirements in the energy sector 11.2.1 Investments 11.2.2 Public Support: Additional financing needs GTF 11.3 Requirements in the field of industrial processes 11.4 needs in agriculture and forestry 11.5 Requirements in the waste sector  Chapter 12. <b>Capacity Building Needs</b>	N/A	Chapter 17. <b>MRV National Greenhouse Gas Emissions</b>	N/A	APPENDIX 1: Detailed Results of GHG Emissions of Tunisia in 2010 APPENDIX 2: Proposed Establishment of a National System Inventory GHG (Sniegies)	The BUR was submitted on 31 December 2014.  It is originally written in French.
N/A	Chapter 5 <b>Information regarding level of received support and BUR preparation and submission needs</b> 5.1 Received support 5.2 Support needs	Bibliography Annexes	N/A	N/A	BUR is submitted on 30 December 2014.  It is originally written in Spanish.

Guideline FCCC/ CP/2011/9/ Add.1 para41 and Annex III	(Executive Summary)	National circumstances Institutional arrangement	National GHG Inventory	Information on mitigation actions and their effects, Methodologies and assumptions
Republic of Korea	Executive Summary	Chapter 1 <b>National Circumstances</b> 1.1 Government Structure 1.2 Population profile 1.3 Economic Profile 1.4 Energy 1.5 Transport 1.6 Building and urban structure 1.7 Agriculture and forestry 1.8 Waste	Chapter 2 <b>National Greenhouse Gas Inventory</b> 2.1 National Greenhouse Gas Inventory System 2.2 Overview of the National Greenhouse Gas Inventory	Chapter 3 <b>Mitigation action and effects</b> 3.1 National Reduction Targets and Roadmap 3.2 Operation of the Greenhouse Gas and Energy Target 3.3 Adoption of the Emission Trading Scheme 3.4 Mitigation Actions by Sector
Andorra	N/A	Chapter 1 <b>Introduction</b> 1.1. Context 1.2. The biennial update report 1.3. The institutional arrangements in place 1.4. The difficulties and shortcomings  Chapter 2 <b>National circumstances</b> 2.1. Physical and natural environment 2.2. Socioeconomic background	Chapter 3 <b>The national inventory of greenhouse gas</b> 3.1. Introduction 3.2. The national inventory system 3.3. Assessment of the results 3.4. Retail categories 3.5. Analysis of key categories 3.6. Uncertainty analysis	Chapter 5 <b>The mitigation measures and their effects</b> 5.1. Mitigation measures in place 5.2. Mitigation measures provided
South Africa	Executive Summary	Chapter 1 <b>National Circumstances</b> 1.1 Introduction 1.2 Geographic profile 1.3 Climate 1.3.1 Mean Conditions 1.3.2 Areas Prone to Natural Disasters 1.3.3 Areas Liable to Drought and Desertification 1.3.4 Areas with Ecosystems Vulnerable to Climate Change 1.3.5 Global Change and Climate Projections 1.4 Population 1.5 Economy 1.6 Energy 1.7 National and Regional Development Priorities Related to Climate Change (Institutional Arrangement is included in the section of National Greenhouse Gas Inventory.)	Chapter 2 <b>National Greenhouse Gas Inventory</b> 2.1 Background and Contexts 2.2 Institutional Arrangement for Preparation of the Inventory 2.2.1 Institutional Arrangement in the Energy Sector 2.2.2 Institutional Arrangement in the IPPU Sector 2.2.3 Institutional Arrangement in the AFOLU Sector 2.2.4 Institutional Arrangement in the Waste Sector 2.3 Calculation Methodology 2.4 Overall GHG Inventory 2000-2010 2.5 GHG Inventory by Sector 2000-2010 2.5.1 Energy Sector 2.5.2 Industrial Procedure and Product Use Sector 2.5.3 Agriculture, Forestry and Other Land Use Sector 2.5.4 Waste Sector	Chapter 3 <b>Mitigation Actions and Their Effects</b> 3.1 Key Elements of South Africa's Approach to Mitigation 3.1.1 Flagship Programmes 3.1.2 Mitigation Potential Analysis 3.1.3 Desired Emission Reduction Outcomes 3.1.4 Carbon Tax 3.2 Key Government Policies and Measures that Impact Climate Change Mitigation 3.2.1 Energy Sector 3.2.2 Industrial Processes and Product Use Sector 3.2.3 Agriculture, Forestry and Land Use Sector 3.2.4 Waste 3.2.5 Financial Measures 3.3 Private Sector Mitigation Initiatives 3.4 Domestic Institutional Arrangement 3.4.1 Inter-Minister Committee on Climate change (IMCCC) 3.4.2 Inter-Governmental Committee on Climate Change (IGCCC) 3.4.3 National Committee on Climate Change (NCCC)
Chile	Executive Summary <b>1. National Circumstances and Institutional Arrangements</b> 1.1. Geography 1.2. Economy 1.3. Institutional arrangements for climate change <b>2. Chile's National Greenhouse Gas Inventory, 1990-2010 Time Series</b> 2.1. Institutional arrangements and preparation of Chile's NGHGI 2.2. Trends in greenhouse gas emissions in Chile <b>3. Greenhouse Gas Mitigation Policies and Actions</b> 3.1. Mitigation actions and policies in Chile 3.2. Nationally Appropriate Mitigation Actions 3.3. Cross-cutting actions to support progress towards a low-carbon economy 3.4. Market-based instruments for environmental externalities 3.5. Measurement, reporting and verification of mitigation actions <b>4. Needs and Support Received in the Area of Climate Change</b> 4.1. Methodology and timeframe 4.2. Needs 4.3. Support received	N/A *	N/A *	N/A *



Constraints and gaps, related financial, technical and capacity needs, support needed and received	Level of support received to enable the preparation and submission of BUR	Information on domestic MRV	Other information	(Annex and Appendix)	(Additional Information)
Chapter 4. <b>Need of Finance, Technology, and Capacity building and assistance</b> 4.1 Need of Finance and Assistance Status 4.2 Need of Technology and Assistance Status 4.3 Need of Capacity Building and Assistance Status	N/A	N/A	N/A	Annex (Emission Trend)	The BUR was submitted on 29 December 2014.
Chapter 6 <b>Information on constraints and gaps, funding, technology needs capacity building and the support received</b> 6.1. Tabular Format 7.1. Information on financial, technical and capacity building 6.2. Tabular Format 7.2. Information on technology needs and technological support received 6.3. Tabular Format 7.3. Information on support received	N/A	N/A	Chapter 4 <b>The projection of greenhouse gas emissions</b> 4.1. Introduction 4.2. Projections for 2050	Annex I. Inventory. Detailed tables (short summary tables) Annex II. Inventory. Detailed tables (summary tables) Annex III. Inventory. Key categories analysis (KCA) Annex IV. Data used and information sources identified Annex V. Method of calculation and assumptions made in the inventory Annex VI. Calculation method and assumptions made in the projection of greenhouse gas	The BUR was submitted on 19 December 2014.  The BUR is originally written in French.
Chapter 4 <b>Financial Resources, Technology Transfer, Capacity Building and Technical Support Received</b> 4.1 Support received 4.1.1 Financial support received 4.1.2 Domestic financial flow for climate change activities 4.1.3 Non-monetized capacity building and technology support received 4.2 Support needs 4.2.1 Financial support needed 4.2.2 Non-monetized capacity building and technology support needed 4.3 Tracking Climate-Related Financial Flows	Chapter 5 <b>Support Received for Preparation of the BUR</b>	Chapter 6 <b>Measurement, Reporting and Verification in South Africa</b> 6.1 Background and Context 6.2 Development of M&E/MRV in South Africa 6.3 The national Climate Change Response Database-The First Step Towards Climate Change M&E 6.4 Shifting from Climate Change Monitoring to Monitoring and Evaluation 6.5 Overview of South Africa's M&E System 6.6 Next Steps	Chapter 7 <b>Additional Information</b> 7.1 Renewable Energy Independent Power Procedure Procurement Programme 7.2 Adaptation 7.2.1 Long Term Adaptation Scenarios 7.2.2 Adaptation Actions 7.3 Integrating Climate Change into Municipal Planning Through the 'Let's Respond toolkit' 7.4 The National Flagship Programme 7.5 2050 Pathways Calculator 7.6 National Atmospheric Emission Inventory System (NAEIS) 7.7 Monitoring and Evaluation in the Agriculture, Forestry and Other Land Use Sector 7.8 Partnership for Market Readiness 7.9 Vertically-Integrated Nationally Appropriate Set of Mitigation Actions	N/A	The BUR was submitted on 17 December 2014.  GHG National Inventory Report (2000-2010) is submitted at the same time.
N/A *	N/A *	N/A *	N/A *	N/A *	* Chile submitted Executive Summary as their BUR)  The BUR was submitted on 10 December 2014.  National Inventory Report is submitted on 5 February 2015.

Guideline FCCC/ CP/2011/9/ Add.1 para41 and Annex III	(Executive Summary)	National circumstances Institutional arrangement	National GHG Inventory	Information on mitigation actions and their effects, Methodologies and assumptions
Singapore	N/A	<p>Chapter 1 <b>National circumstances</b> Country Profile - Land Area - Climate - Population - Economy - Water</p> <p>Singapore's National Circumstances and Constraints</p> <p>Singapore's Limited Access to Alternative Energy Sources - Biomass - Carbon Capture, Storage and Utilization (CCSU) - Geothermal - Hydroelectric - Marine (tidal and wave power) - Nuclear - Solar - Wind</p> <p>Asia's Greenest City</p> <p>Institutional Arrangement</p>	<p>Chapter 2 <b>National Greenhouse Gas Inventory</b> Methodology Used</p> <p>Singapore's Emission for 2010 - Sectoral Emissions</p> <p>Breakdown of Emission by IPCC Sector - All Energy - Industrial Processes - Waste - Agriculture - Land Use Change and Forestry</p> <p>Key Category Analysis</p> <p>Uncertainty</p> <p>Time Series of Greenhouse Gas Emissions (2000-2010)</p> <p>Preparation of the Greenhouse Gas Inventory 1) Quality Control and Quality Assurance for the Collection / Compilation of Data 2) Quality Control for the Computation of Emissions 3) Quality Assurance for Computation of Emissions 4) Endorsement</p> <p>Future Enhancements for Greenhouse Gas Inventory Compilation</p>	<p>Chapter 3 <b>Mitigation Measures</b> Introduction - Singapore's Approach to Reducing Emissions</p> <p>Measures to Reduce Emissions - Measure 1: Shifting to Cleaner Energy Sources - Measure 2: Improving Industrial Energy Efficiency - Measure 3: Greening Buildings - Measure 4: Shifting Travel Demand to Low-Emission Modes and Reducing Vehicular Emissions - Measure 5: Improving Energy Performance Standards of Household Appliances and Promoting Energy Efficiency to Households - Measure 6: Reducing Emissions from Waste and Wastewater Treatment</p> <p>International Market Mechanisms</p> <p>Domestic Measurement, Reporting and Verification</p>
Vietnam	Executive Summary	<p>Chapter 1 <b>National circumstances</b> 1.1. Natural conditions 1.1.1. Geography 1.1.2. Climate conditions and climate change scenarios for Viet Nam 1.1.3. Water resources 1.1.4. Environment 1.2. Social and economic overview 1.2.1. Population 1.2.2. Agriculture 1.2.3. Forestry 1.2.4. Industry 1.2.5. Transportation 1.2.6. Energy 1.2.7. Economic growth 1.3. Sustainable development strategy 1.4. Institutional arrangement for development of Biennial Updated Reports and National Communications of Viet Nam 1.4.1. General information 1.4.2. Relevant legal documents 1.4.3. Organizational structure for development of BUR1</p>	<p>Chapter 2 <b>2010 National Greenhouse Gas Inventory</b> 2.1. Institutional arrangement for National GHG Inventory 2.2. Methodology, data source and emission factors 2.3. Quality control and quality assurance 2.4. Results of 2010 National GHG Inventory 2.4.1. Key emission/removal categories 2.4.2. GHG inventory by sector 2.4.3. Total emission sources and sinks in 2010 2.4.4. Comparison of GHG emissions in 1994, 2000 and 2010 2.5. GHG emission projections for 2020 and 2030 2.5.1. General information 2.5.2. GHG emission projections</p>	<p>Chapter 3 <b>Greenhouse Gas Emission Mitigation Action</b> 3.1. NAMA preparation 3.1.1. General information 3.1.2. Development of NAMA proposals 3.1.3. MRV preparation 3.2. CDM Implementation 3.3. Implementation of JCM and other mechanisms 3.4. Development of GHG mitigation options 3.4.1. GHG mitigation options in energy sector 3.4.2. GHG mitigation options in agriculture sector 3.4.3. GHG mitigation options in LULUCF sector</p>
Namibia	Executive summary	<p>Chapter 1 <b>National circumstances and institutional arrangements related to the preparation of the National Communication and Biennial Update Reports on a continuous basis</b> 1.1 Introduction 1.2 Convention obligations 1.3 Institutional arrangement 1.4 Geographical Characteristics 1.5 Biodiversity 1.6 Water Resources 1.7 Agriculture and Forestry 1.8 Fisheries 1.9 Tourism 1.10 Mining 1.11 Manufacturing 1.12 Energy 1.13 Transport 1.14 Waste 1.15 Economic Growth 1.16 Population 1.17 Health</p>	<p>Chapter 2: <b>Greenhouse Gas Inventory</b> 2.1 Introduction 2.2 Methodology 2.3 Activity Data 2.4 Emission Factors 2.5 Results 2.6 QA/QC 2.7 Completeness 2.8 Uncertainty Analysis 2.9 Key Category Analysis 2.10 Archiving 2.11 Constraints, Gaps and Needs 2.12 National Inventory Improvement Plan 2.13 Energy 2.14 Industrial Processes and Product Use (IPPU) 2.15 Agriculture, Fisheries and Other Land Use (AFPLU) 2.16 Waste Sector</p>	<p>Chapter 3 <b>Mitigation actions and their effects, including associated methodologies and assumptions</b> (The country has not yet developed a mitigation plan and NAMA)</p>

Constraints and gaps, related financial, technical and capacity needs, support needed and received	Level of support received to enable the preparation and submission of BUR	Information on domestic MRV	Other information	(Annex and Appendix)	(Additional Information)
Described in Chapter 1.	N/A	Described in Chapter 3	N/A	<b>Annex to Biennial Update Report</b> - Greenhouse Gas Inventory - Glossary	BUR was submitted on 8 December 2014.  Singapore's Third National Communication is submitted at the same time.  <b>Third National Communication Executive Summary</b> Chapter 1 National Circumstances (Summary) Chapter 2 National Greenhouse Gas Inventory (Summary) Chapter 3 Mitigation Measures (Summary) Chapter 4 Vulnerability and Adaptation Measures Chapter 5 International Cooperation
Chapter 4 <b>Financial, Technology and Capacity Needs and Support Received for Climate Change Activities</b> 4.1. Gaps and constraints 4.1.1. National GHG Inventory 4.1.2. NAMA 4.1.3. Application of climate change response technologies 4.2. Financial, technology and capacity needs 4.2.1. Financial needs 4.2.2. Technology needs 4.2.3. Capacity needs 4.3. Support received for climate change activities	Described in Chapter 4	Described in Chapter 3	N/A	Appendix I: Information on preparation for three NAMAs Appendix II: List of Viet Nam's CDM Projects registered by the EB from October 2010	The BUR was submitted on 8 December 2014.
Chapter 5 <b>Constraints and gaps, and related financial, technical and capacity needs, including a description of support needed and received</b> 5.1 Reporting 5.2 Implementation 5.3 Technical and Capacity Building Needs 5.4 Financial Needs 5.5 Technology Needs Assessment and Technology Transfer Needs	Chapter 6 <b>Information on the level of support received to enable the preparation and submission of biennial update reports</b> 6.1 Financial support 6.2 Technical support	Chapter 4 <b>Information on MRV of Domestically supported NAMAs</b> 4.1 Overall coordination of MRV 4.2 GHG Inventory System 4.3 Mitigation Actions (including NAMAs) 4.4 Support Required 4.5 Support Received	Chapter 7 <b>Any other information relevant to the achievement of the objective of the Convention and suitable for inclusion in its biennial update report</b>	N/A	The BUR was submitted on 2 December 2014.

# Conclusions and key messages

By

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## **SECTION I: KEY TOPICS ON NAMAs**

### **NAMAs in the context of national climate policy planning**

#### *Conclusions*

- Elaboration of national climate policy plans after the COP16 held in Cancun, have been recognized more important, rather than stand-alone mitigation activities, where Parties agreed in the preparation of Low Carbon/Emissions Development Strategies (LCDS/LEDS).
- Countries increased their efforts to consider policies and strategies to deal with mitigation, adaptation and development issues, including the opportunity to engage in a green growth.
- Given their flexibility, NAMAs may be a vehicle in which materialize actions under climate change plans, either at the sectoral level or in a bigger context.
- Preparation of INDCs agreed at the COP19 in Warsaw, will serve as a key input for the new international agreement that would be negotiated at the COP21 in Paris, and that will start running in 2020. NAMAs are a key component to be reflected in INDCs.
- Preparation of INDCs depends also on the country's circumstances and capabilities.

#### *Key messages*

- Contents of climate policies and plans are based on national circumstances, not only at the geographical context affected directly by climate phenomena, but also at the social, political, and economic level.
- Planning for climate change is nowadays strongly linked with sustainable development or green growth.
- NAMAs are a tool to channel finance, and finance may encourage Parties to increase the level of ambition of INDCs.
- While success in the preparation of national climate policies and plans require careful coordination between different stakeholders at different levels, NAMAs provide an opportunity to land such plans on the ground.

### **Institutional arrangements for NAMAs and MRV**

#### *Conclusions*

- An appropriate institutional arrangement that facilitates coordination between stakeholders is required in order to operationalize NAMAs effectively.
- As part of the institutional arrangement, a designated climate change authority can be in charge of gathering stakeholders, facilitating the decision-making process, coordinating with donors, applying for projects and funds, implementing projects, etc.
- A MRV system for domestic actions can be built upon experiences such as existing monitoring and evaluation of policies and measures, depending the level of actions, including activities/projects, entities, programmes, sectors, and national policies

#### *Key messages*

- Having a single climate change authority that gathers representatives of all line ministries, facilitates getting consensus and the decision-making process. At the same time, it can act as a single-window that can deal with financiers and international community.
- Having an appropriately designed institutional arrangement facilitates channeling international

support for projects. A lack of a well-deigned institutional arrangement can prevent donors from actively support and conduct projects in the host country.

## NAMA support schemes

### Conclusions

- NAMA support schemes are not identical to NAMA finance schemes. They are focused on providing financial and non-financial resources to facilitate the preparation and implementation of NAMAs.
- In principle, it is believed that NAMAs should be conducive to transformational change, which means that a NAMA should allow for scaling-up and replication, it will include mechanisms to ensure sustainability, and will allow for systematic learning process.
- In sum, NAMA support programs can be categorized into three types: support for implementation (dedicated and non-dedicated), support for preparation and readiness (multilateral and bilateral), and information platforms.
- The NAMA Registry is the information platform developed by the UNFCCC to record information of NAMAs seeking support and also recognition, which means it aims at operating as a matching mechanism. However registration is made in a voluntary basis and available information is still very limited. In spite of that, these initiatives help to improve transparency in the process.

### Key messages

- Despite a lack of clarity in the concept and extent of activities considered as NAMAs, and despite its limited timeline (until 2020), several initiatives in the form of support schemes have been created and assisted the preparation and/or implementation of NAMAs.
- The NAMA Facility is recognized as a significant support action for the implementation of NAMAs. Currently there is one project in the implementation phase under this scheme while 8 projects are under appraisal.
- The inability of developing countries to demonstrate finance transparency as a prerequisite to receive external support, together with a defective or in some cases, inexistent structure in charge of the MRV process, makes it even difficult to channel support. Often times, this situation is due to a limited technical capacity in an already understaffed organization.
- The fact that private banks and the private sector operate under the assumption of obtaining revenues from its activities, makes it difficult to think in viable alternatives to involve them in supporting schemes for NAMAs.

## Technology transfer through the JCM ad CTCN

### Conclusions

- The Cancun Agreement acknowledges the development and implementation of various approaches, including opportunities to use markets and non-markets, to promote mitigation actions. The Joint Crediting Mechanism (JCM) promoted by the Japanese government is one alternative in line of what the Cancun Agreement has declared.
- Some signatory countries have decided to conduct NAMAs utilizing opportunities for transfer of technologies and finance through the JCM.
- Combining grant fund provided by the Ministry of the Environment, Japan with support by JICA and ADB, a fund to support a “leapfrog type of development” has been established.

#### *Key messages*

- In light of an absence of supporting options for NAMAs, a bilateral type of mechanism such as the JCM, becomes an alternative to conduct mitigation actions to introduce environmentally friendly technologies and channel financial support.
- Since the JCM avoids the complexity and time-consuming process of the CDM process, the scope of options to start mitigation actions becomes wider.

## **Overview of submitted Biennial Update Report**

#### *Conclusions*

- According to the UNFCCC guidelines, there are seven sections proposed to be included in BUR.
- Ten countries have submitted their BUR by 9 January 2015 (Namibia, Singapore, Vietnam, Chile, South Africa, Andorra (Fr.), the Republic Korea, Peru (Sp.), Brazil and Tunisia (Fr.)).
- Highlighting differences depending on the countries' circumstances, BURs are described generally along with the UNFCCC guidelines.
- Some of the chapters were omitted and some countries did not describe or included information on domestic MRV in the chapter of mitigation efforts, or their efforts for the INDC that leads to the ambition.

## **Efforts for the INDC that leads to the ambition**

#### *Conclusions*

- In the COP20 held in Lima, Parties negotiated the outcomes to advance towards reaching an agreement at the COP 21 in Paris, indicating the information required.
- Existing activities, such as National communication and NAMAs, constitute the starting point and have a linkage with INDCs preparation.
- In order to maintain the transparency of information and the reliability of INDCs, collecting precise data and accurate reporting are vital.
- A number of alternative support activities can be utilized for the preparation of INDCs.
- The focus should be for countries to fully engage in this effort and accomplish the preparation of INDCs as accurate as possible to meet the 2 degrees goal.

#### *Key messages*

- INDC is an important tool for driving countries toward achieving the 1.5 to 2 degrees target. It is necessary to make efforts to ensure accurate information and transparency.
- Support for the INDC preparations is already available and it is advisable to reflect the existing efforts into INDC.

## **SECTION II: CASE STUDIES**

### **NAMAs to accelerate geothermal power: Lessons from Kenya**

#### *Conclusions*

- The development process had to overcome challenges, including raising awareness and obtaining buy-in of key stakeholders, securing financial partners, documenting and communicating the NAMA,



and dealing with questions about ‘additionality’ .

- Considering the enormous potential to exploit geothermal power, greater private sector involvement is needed in order to materialize its ambitious National Climate Change Action Plan (NCCAP).

#### *Key messages*

- NAMA is an important step in making the National Climate Change Action Plan (NCCAP) a reality on the ground.
- The scale of transformational NAMAs normally requires large and rapid investments from national and international sources, although it is difficult to precise the scope of the project or mitigation goals at early stages.
- The government has a clear role on how to promote the private sector and also international organizations participation, through policies, creation of new entities, formalization of agreements, etc.
- Financial partners can bring experience in addition to funds. However, larger partners might have rigid structures difficult to adapt to the NAMA requirements. However, it is important to have a deep understanding of potential implementation partners and donors in early stages.
- It is suggested to prepare a sort of a prospectus listing different NAMA proposals for different funding opportunities. This can be used to discuss with potential partners at early stages, in order to identify potential areas for collaboration.

## **Institutional arrangements for mitigation actions in Lao PDR**

#### *Conclusions*

- In recent years, Lao PDR has engaged in making their institutional arrangement by establishing the National Environment Committee (NEC), the Climate Change Office (CCO), the Department of Disaster Management and Climate Change (DDMCC), and a Technical Working Group on Climate Change (TWGCC), that in a top-down manner involves the participation of the Vice prime minister and representatives from 14 ministries.
- In tandem to the formulation of the climate change strategy, the Climate Change Action Plan (2013-2020) has been formulated identifying key sectors.

#### *Key messages*

- A long history of experiences in mitigation actions and interaction with partner organizations and international funders prompted the formation of the current institutional arrangement, where policy and project formulation of all environment-related issues are centralized, in order to facilitate consensus building and decision-making process.
- It is expected that a solid institutional arrangement will facilitate development of policies, improve the technical capacity, facilitate the interaction with external organizations, and will help organize the MRV process. In order to do this, continuous adjustments and feedback are needed.

## **Recent NAMA-related projects and activities in Mongolia**

#### *Conclusions*

- NAMA has been assigned a key role in the transformation to a low-carbon society in Mongolia, by identifying mitigation options at an early stage. Preparation of NAMA proposals have derived in application to funds such as the NAMA Facility, announcement through the NAMA Registry, and

also through active search of alternative international support schemes such as the JCM.

- Barriers of NAMA implementation were also identified highlighting lack of capacity and institutional arrangements, limited market diffusion of energy efficient technologies, lack of accessible funding schemes, etc.
- Small to middle scale JCM projects in association with the private sector will be possible through a finance scheme in partnership with ADB, specifically a two-step loan with the JCM leap-frog finance.

#### *Key Messages*

- The government is engaged in policy formulation aiming at a reform in their energy sector, through energy options such as energy efficiency (EE) standards, retrofitting of existing buildings and providing insulation to traditional dwellings. A package of EE-based policies including the draft Energy Efficiency and Energy Conservation Law, and Green Development Strategy comprises these efforts.
- Proactive coordination between government, international donors, and local banks can lead to a creation of incentive schemes for the participation of the private sector, such as the creation of loan programs with preferential interest rates, or the creation of a dedicated government-led development fund acting as a second floor bank. Partial absorption of inherent risks by the government is key.

## **Fostering investment in biomass waste-to-energy technologies – The case of Peru**

#### *Conclusions*

- Design of financial mechanisms is emerging as one of the core elements of successful NAMA development.
- Analysis of the renewable energy potential has determined that biomass waste-to-energy activities have the potential to expand electrification in rural areas of Peru. This option has the potential to add value to agro and forestry production and processing and to increase energy access in rural areas.
- The objective of this NAMA is to generate sustainable energy from biomass waste to promote rural sustainable development while contributing to achieve Peru's renewable energy target and global climate change mitigation.

#### *Key Messages*

- The agricultural context allowed for the creation of innovative policies, programs and plans to finance the development of the renewable energy sector, including waste-to-energy technologies. More specifically, a renewable energy auction system for large-scale on-grid projects, and the establishment of a financial infrastructure to support renewable energy projects through a microcredit scheme.
- Awareness among stakeholders proved to be of importance in the sense that knowledge of potentials and benefits can increase participation in projects and programs.
- The creation of a guarantee fund can minimize the high-risk perception of waste-to-energy projects. This fund can provide credit risk guarantees and risk mitigation structures to enable local banks and finance institutions to provide long-term loans at more attractive terms. At the same time, it can act as a co-financer or provide result-based finance.

## Prioritization of NAMAs in the waste sector of Vietnam

### Conclusions

- Being one of the most vulnerable countries to climate change impacts, Vietnam has engaged proactively in preparing policies, programs and strategies to deal with climate change. As part of these efforts the government also released a specific regulation approving the development of NAMA framework and implementation of NAMAs in Vietnam.
- A very weak data gathering system and lack of trained personnel makes a challenge to work in projections of scenarios. However, based on two different studies, two different business-as-usual scenarios on future GHG emissions in the waste sector have been developed. In order to fulfill the gap on data gathering, a questionnaire survey has been distributed to semi-public entities in charge of solid waste collection.

### Key messages

- A specifically designed survey has been distributed to entities in charge of solid waste collection, in order to determine up-to-date information. It also served as a key reference to develop lists of waste treatment technologies to develop NAMA scenarios. However, successful adoption of a specific technology depends on a series of factors.
- Conduction of surveys might be helpful but is no replacement for a data gathering system. Development of a comprehensive database and a solid data gathering system is required. This is strongly linked with development of the MRV system.

## How to upgrade from a PoA to a NAMA? The case of clean cooking in Peru

### Conclusions

- Some discussions have started on the possibility to upgrade PoA to NAMAs. Microsol's climate mitigation projects are an example of a social-business conducting the introduction of improved cookstoves through result based finance.
- Project consists in an installation-follow up-maintenance-spare parts replacement in a virtuous cycle that successfully conducted VPAs and verification under the Voluntary Gold Standard.
- Participation of the private sector was partly motivated through CSR commitments.
- Sustainability of the project is linked with financing and duration of the cookstoves. In this sense, showing the multiple benefits of the project is important. There is a great potential for scaling up clean cooking activities in Peru, because the potential for emissions reduction is also considerable.
- Characteristics of NAMAs seem to show that PoA can be upgraded to NAMAs but more discussion and diffusion of information is needed.

### Key Messages

- This example shows that working with mitigation actions might be challenging, but with some innovativeness and stakeholders involvement, it is possible to set up complementary public-private partnerships that benefit all participants, especially the project recipients which in this case are the most poverty affected people of the country side of Peru.
- Success of the project is in part due to support obtained by the government that has created a subsidy and funding program, NGOs, regional governments and support from international financiers.
- Information and knowledge is available. The project has worked with Gold Standard methodologies

to account GHG emissions reduction.

- Up to date information has been further collected through qualitative surveys that year to year has been adjusted to improve the accuracy. Technology plays its part since use of tablets in surveys has been conducted in order to reduce errors.

## Developing countries are taking the lead in climate change mitigation through NAMAs

### Conclusions

- The Low Emission Capacity Building (LECB) Programme of the UNDP has worked in the last 4 years with 25 developing countries to support national development plans while helping to integrate low-carbon and sustainable development goals. As a result they have gathered a remarkable pool of knowledge in relation to NAMA practices.
- In spite of the low pace of international negotiations, voluntary national and subnational commitments are emerging to reduce GHG emissions seem to show a positive direction towards the post-2020 climate regime.
- Based on experiences in different fronts by developing countries, confidence is increasing, and with the possibility to scale-up funding from sources such as the Green Climate Fund, it is believed that NAMAs will continue to play an important role in the formation of low-carbon societies.

### Key messages

- Despite the inexistence of official instructions on NAMAs from the UNFCCC, limited access to support schemes, etc. developing countries have recognized the benefits of implementing NAMAs, and they are actively experimenting with NAMAs in different contexts and according to their priorities.
- In terms of NAMA design, national appropriateness is important as well as a properly studied finance and technological viability, a reliable and efficient MRV system, full participation from stakeholders including a champion who can lead the process.
- Appropriately conducted identification of NAMA options and prioritization is required, and once the project is selected, support from the government is key. This has to be complemented with awareness raising, training programs, etc.
- In terms of MRV, a well-designed MRV system is required to reflect progress in the reduction of GHG emissions, non-emission impacts, and financial support. At the same time, it can support international reporting requirements or the design of intended nationally determined contributions, for instance.
- MRV should not be overly burdensome and it has to have a clear objective. Depending on the circumstances, the objective varies between countries.
- In terms of institutional arrangement, the following elements are crucial: i) extensive coordination between stakeholders, ii) minimized conflict of interests, iii) clearly defined roles, and iv) political commitment and alignment with national priorities.







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