Mitigation Talks

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Contents

EDITOR
Leena Srivastava

Series Editor
Neha Pahuja

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From Series Editor's Desk

With the atmospheric concentration of carbon dioxide touching 400 ppm, temperature rise of 2 °C appears inevitable. Moreover, global greenhouse gas (GHG) emissions are continuing to rise. There is, therefore, an urgent need to increase efforts to reduce GHG emissions. The developed countries will have to enhance their ambition levels both in terms of mitigation and support for mitigation in developing country. This issue focuses on key issues at international level and also highlights the practical experiences while designing and implementing NAMAs.

The first article provides a commentary on climate policy after Doha wherein the author suggests to focus on ethics and responsibility rather than on efficiency, and emphasizes on bottom-up initiatives as a way forward. The second article, however, emphasizes on the possibility of enhancing mutual trust in a regime by accommodating flexibility and diversity in designing of a new MRV system. The third article, summarizes the opportunities for harmonizing technology need assessment (TNA) with other processes under the Convention. It further dwells into interlinkages between TNA and development of NAMAs. The following article highlights specific examples and cases of JICA's support for NAMAs in Serbia and Vietnam. Thereby, discussing the role of Japan and JICA in climate change development and emphasizing that Japan is the largest donor among OECD DAC members.

In the next article, author emphasizes on the linkages of development and GHG emissions. The author also provides a synthesis of interactions with relevant stakeholders in South Africa on the trade-offs that the twin challenge of poverty alleviation and GHG reduction would bring. Thereby, introducing a new tool, Mitigation Action Impact Matrix (M:AIM) for developing an integrated strategy on climate change and sustainable development. The following article summarizes another tool developed by IISD to develop financeable NAMAs based on their experience in Kenya and ten Congo Basin countries. Last article discusses mitigation options for India that can be developed as NAMAs by synthesizing the policy and planning documents.

Neha Pahuja

DIPLOMACY

Climate Policy after Doha: The big picture

*Asbjørn Torvanger**
Senior Reserach Fellow, CICERO

The Doha climate conference in late autumn 2012 took a number of small steps forward by agreeing on a second commitment period under the Kyoto Protocol and procedures for negotiating a new global agreement by 2015. It has been more than 20 years since global climate policy negotiations were initiated and today we know that it is very challenging to agree on a treaty that is ambitious enough to have a significant impact on global greenhouse gas emissions. Such a treaty would need both broad participation and efficient mechanisms for compliance. The likelihood of negotiating a new, ambitious global agreement in less than two years, and given the present state of affairs, seems slim. However, more than 85 developing and developed countries have made pledges to reduce their emissions. Even if all these pledges are fulfilled — of which some are unclear or include wide ranges — the world is on a steady course for a 3–4 °C warming by 2100, far above the 2 °C warming target that has been adopted by all countries. In short, the world has adopted an ambitious 2 °C climate target to reduce the risk of dangerous impacts of human-induced global warming, but the gap between this target — better underpinned by scientific knowledge than ever before — and policies and measures to meet this target is larger than ever. In fact, this gap seems to have widened even more over the last decade.

The big picture shows that humans are dealing with the climate change challenge in a very irrational manner. Studies have shown that we can handle this challenge in technical and economic terms, but we seem unable to handle it well in social and political terms (I could also add in psychological, cultural, and institutional terms). In a sense, our species seem to have insufficient 'social intelligence'. What is, thus, needed the most today is 'social engineering'. So why have we worked ourselves into this corner? In my mind, the core of the problem is that humans have not yet adapted well enough to the ecological boundaries of our planet, in terms of consumption and growth, pollution, use of resources and land areas, and population growth. The human footprint has detrimental effects on ecosystems, climate, and living conditions of other animal and plant species. Most countries, politicians, firms, and people are short-sighted, and focus mostly on their own interests in a narrow sense, that is, they tend to focus solely on the interests of man and not of other species, and do not have sufficient understanding of the situation in a wider context. Finding a joint global solution is complicated by differences in living conditions, welfare, resource bases, energy systems, culture and traditions, beliefs about national costs and benefits of reducing emissions, and of impacts of climate change and the potential to adapt to these changes. The focus is on burden-sharing and costs of mitigation rather than on the welfare gain of climate action compared to inaction. The focus is on avoiding doing more than your neighbour — and thus, reducing the risk of being exploited — or finding excuses for why you should do less than your neighbour, instead of doing the right (ethical) thing for common good. After all, being a good example can inspire your neighbours to do more. Since substantial mitigation of greenhouse gas emissions seem so difficult, we are considering geo-engineering to cool down the Earth, but such measures could lead to large-scale unwanted side effects and unforeseen risks. The common opinion is that economic and consumption growth can and will go on for decades or even a century, even if there are some negative impacts of climate change. But people do not realize that we risk disturbing vital ecological and resource systems that could significantly reduce the earth's ability to support a large population as well as a high welfare level. In reality, we are undertaking a large experiment with the climate system, where we may be in for many surprises that could cause huge problems in the future, and also irreversible changes. With a sensible global risk management strategy to lower global greenhouse gas emissions, this risk could be substantially reduced.

What are the most promising ways forward for climate policies given the huge scale of the climate change challenge and our seemingly limited ability to

* E-mail: asbjorn.torvanger@cicero.oslo.no

respond in a rational manner? Since the problem is so complex, there is no single solution, rather a number of strategies and measures that can contribute to a solution. Negotiations for a new global climate policy agreement should continue, even if the probability of success is low over the next decade. I believe that the following actions will make a difference and turn out to be a way forward:

- Climate policies should focus more on ethics and responsibilities than on efficiency
- Climate policies should emphasize effective strategies, policy tools, and measures more than national emission ceilings and specific targets in the short-and medium-term
- Support climate policy collaboration between most willing countries; e.g., regional treaties
- Stimulate and be responsive to all bottom-up and local initiatives to implement greenhouse gas emission reduction measures
- Establish extensive public support schemes for development of green technologies as well as policy frameworks that stimulate their deployment
- Enable good, long-term business conditions for all green and sustainable technologies
- Stimulate international business collaboration on good climate practice, guidelines, and socially responsible behaviour
- Collaborate with big companies interested in climate-friendly business, and with those that have long-term strategies and sizeable funding possibilities
- Concerned organizations, share-holders, consumers, citizens, and local politicians can influence investment strategies of firms, institutional investors, funds, and holding companies to take a climate-friendly direction

Some Reflections on the Interaction between NAMAs and Transparency

*Thomas Spencer**
Research Fellow, IDDRI

Introduction

Nationally Appropriate Mitigation Actions (NAMAs) are a flexible vehicle for developing countries to undertake mitigation action under the United Nations Framework Convention on Climate Change (UNFCCC). This flexibility is necessary because of the vast range of circumstances in developing countries and the uncertainties surrounding their future economic growth and their financial and administrative capacities to successfully implement mitigation objectives.

However, flexibility also brings challenges, notably those relating to the transparency of developing country actions, though this challenge is not limited to developing countries alone. Developing country actions, however, present a greater range of uncertainty, related in particular to the emissions baselines used and the "additionality" of any relative or absolute deviation from this baseline. This uncertainty is both *ex ante* (additionality) and *ex post* (achievement). Recent articles have highlighted that this kind of uncertainty regarding NAMAs can have a very large impact on emissions.[1]

In a collective action challenge like climate change mitigation, transparency, and communication between parties is fundamental to achieve cooperation and collectively optimal action. This article, therefore, aims to reflect on the interaction of the design of NAMAs and the transparency regime. The aim is to inform the future discussion under the new negotiation track, the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP), as well as implementation of the accords achieved since Copenhagen.

Let us start with a couple of definitions of the elements that comprise the transparency regime:

- *Accounting*: This refers to the rules, principles, and information necessary for the *ex ante* definition of countries' mitigation actions, i.e., the sectors, gases, period, emissions baseline, etc.
- *Measurement, reporting and verification (MRV)*: This refers to a system of information exchange and verification intended to ensure the implementation of accurate and complete emissions inventories, as well as inform other parties about progress made in achieving mitigation actions or commitments.
- *Compliance*: This article does not treat the compliance regime, which is a separate step in the transparency framework. Treating different elements — accounting, MRV, compliance — separately can help to depoliticize somewhat the issue of transparency and develop better technical solutions to the steps of accounting and MRV.

Illustration with the Chinese Example

Under the Copenhagen and Cancun Accords, China has adopted a voluntary autonomous objective of reducing its carbon intensity by 40–45 per cent by 2020 (compared to 2005 levels), as well as a number of other measures related to its non-fossil fuel share in primary energy and forest coverage.[2] This objective is voluntary, but will be subjected to the MRV regime developed in Cancun (International Consultation and Analysis, [ICA]). Nonetheless, the international community is obviously very interested in the 'additionality' of this objective, its implications for future Chinese emissions, and its achievement.

Figure 1 outlines some of the key elements of the Chinese example. Panel 1 shows, in blue, the evolution of Chinese carbon intensity from 2005 to 2010, measured in kg CO_2/USD_{2005} GDP at market rates, indexed to 2005. It also shows two other estimates for 2010 carbon intensity, from the Beijing office of the Climate Policy Initiative (CPI) and the official Energy Research Institute (ERI), in green and purple, respectively. The numbers for 2010 carbon intensity,

* E-mail: thomas.spencer@iddri.org

1 See, e.g., M den Elzen et al. (2013), "Analysing the greenhouse gas emission reductions of the mitigation action plans by non-Annex I countries by 2020", Energy Policy, 56.

2 See FCCC/AWGLCA/2011/INF.1, pp. 11.

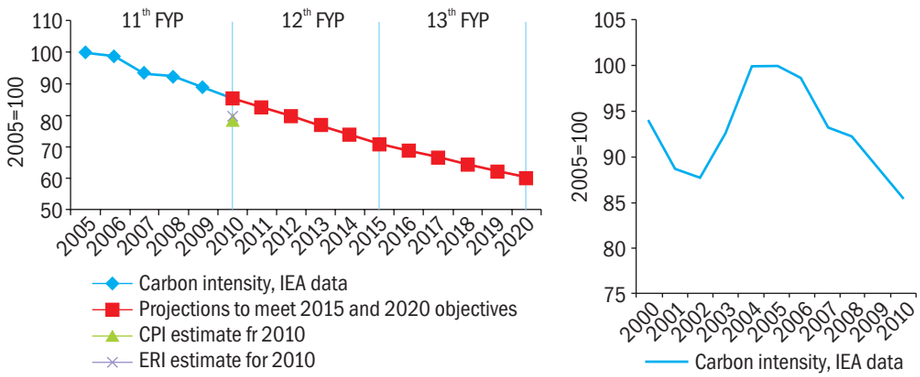

Figure 1: Chinese carbon intensity trajectories and objectives (2005–2020)

with respect to 2005, are as follows: –14.6 per cent (IEA), –21 per cent (CPI), and –20.5 per cent (ERI).[3] Clearly, this is a large discrepancy, and one which has implications for additional efforts required to reach the 2015 and 2020 carbon objectives.

Under the 12th Five-Year Plan (FYP), China also adopted a carbon intensity target of a 17 per cent reduction by 2015 from the 2010 levels, which translates to an objective of ~29.1 per cent from 2005 levels.[4] Panel 1 of Figure 1 also shows the intensity trajectory required to meet the 12th FYP objective and the 2020 international objective of a 40 per cent reduction in carbon intensity by 2020 from 2005, in red.

Two conclusions emerge from this discussion:

- *Data matters*: The discrepancy between the three 2010 carbon intensity estimates — IEA, CPI, and ERI — have significant implications for the trajectory required to meet the 2020 objective. Taking IEA data, China would have to achieve a 2.54 per cent reduction in its carbon intensity per year between 2010 and 2020 in order to meet the 40 per cent carbon intensity reduction objective. Taking the ERI/CPI 2010 data, this would fall to a 1.92 per cent reduction per year; achieving the –45 per cent target by 2020 would require a reduction of 2.42 per cent per year.
- *China is taking its 2020 pledge seriously*: The 12th FYP objective is consistent with the trajectory to achieve the 2020 objectives, although the slope of the curve depends importantly on the data taken for 2010. It is, therefore, useful to also look at other indicators. Panel 2 shows the Chinese carbon intensity for 2000–2010, with a noticeable increase in carbon intensity from 2001 to 2005 and then the strong decline from 2006 to 2011 as the additional measures of the 11th FYP are implemented; these trends are also reflected in energy intensity. Here, the rate of industrial growth seems to be a key factor in the upward energy intensity trend during 2001–2005. It was 10.9 per cent per year between the years 2001–2005 and 11.7 per cent per year between the years 2006–2010, as compared to the overall GDP growth of 9.1 per cent per year and 10.7 per cent per year, respectively.[5] The carbon intensity of electricity production has also dropped sharply during the 11th FYP, mainly due to the increased efficiency of coal production (the forced closure of small plants), but also due to increased low-carbon production, albeit small in relative terms. Between 2005 and 2010 the overall carbon intensity of electricity dropped by 11.2 per cent compared to a 9.1 per cent drop in the carbon intensity of electricity production from coal.

3 See the discussion in E Guérin and X Wang (2012), "Mitigation targets and actions in China up to 2020", IDDRI.

4 According to IEA data, in 2005, Chinese carbon intensity was 2.10 kg CO2/USD2005 GDP at market prices, and 1.79 in 2010. The 12 FYP objective, i.e., a reduction of 17 per cent from 2010 by 2015, would equate to 1.49 kg CO2/USD2005 GDP, or a reduction of 29.1 per cent from 2005 levels.

5 All data from the Chinese Bureau of Statistics.

Discussion: Interactions between NAMAs and transparency

This article has shown that the uncertainties around accounting and MRV create large gaps in the transparency of what countries are doing. This undermines mutual trust. It has also showed that diversity and flexibility will remain key principles of developing country action under the climate regime. This is due to their lower capacities, more volatile and uncertain growth, and large diversity of circumstances.

The question, therefore, is: what kind of regime could accommodate this flexibility and diversity while creating transparency? *Ex ante* common accounting rules may not be feasible; this would leave insufficient space for the necessary flexibility in the system. However, principles should be developed for deciding what kind of information should be contained in different NAMAs, based on a tiered approach differentiating absolute deviations from BAU, relative reductions in carbon intensity, and individual sectoral measures. These requirements should give much greater information on the drivers of emissions trends, and the measures intended to reach headline objectives. The MRV system could be based on significantly broader and more intensive reporting requirements, and independent, facilitative review processes for data and implementation. The key objective would be to reinforce developing country policy and reporting capacities via facilitative cooperation.

The current transparency regime represents a significant step forward. But it clearly needs to be reinforced over time. A key obstacle is the political economy. During the run up to Copenhagen and Cancun, developing countries were concerned about the compliance implications of the transparency regime. Separating the various elements of transparency — accounting, MRV, and compliance — would allow for a focus on less contentious, more technical elements (accounting and MRV). The principles of facilitation, sovereignty, and positive reciprocity should be established as the core of the evolving transparency regime.

Opportunities for Harmonizing Technology Needs Assessments with Other Processes under the Convention

*Wytze van der Gaast and Vlasis Oikonomou**
JI Network (JIN)

Introduction

Development and transfer of technologies for mitigation and adaptation has been a key element of international climate policy-making since the adoption of the UN Framework Convention on Climate Change (UNFCCC, Art. 4.5). In order to support developing countries to specify their needs for such technologies, the seventh Conference of the Parties (COP-7) held in Marrakech, Morocco, in 2001, encouraged them "to undertake assessments of country-specific technology needs, subject to the provision of resources, as appropriate to country-specific circumstances".[1] After that, 94 developing countries received funding through the Global Environment Facility (GEF), the UN Development Programme (UNDP), and the UN Environment Programme (UNEP) to conduct technology needs assessments (TNAs) for climate change.

In 2008, TNA development was included in the Poznan Strategic Programme on Technology Transfer as a key component for "scaling up the level of investment in technology transfer in order to help developing countries address their needs for environmentally sound technologies".[2] To support this initiative, an updated handbook was published and new funding was made available through the GEF. Currently, 36 developing countries are conducting TNAs under the GEF/UNEP TNA Project.[3]

TNAs do not solely focus on technologies, but aim at embedding climate technology choices in the economic, environmental, and social short-and longer-term priorities of countries. In order to do this, the TNA process takes a country's vision on sustainable development as a starting point, and examines through a number of participatory steps, what pathway will lead to that vision and which technologies are most suitable within that pathway. In other words, the output of a TNA is a portfolio of prioritized low-emission and climate-resilient technology options, but these are selected as part of an overarching development strategy.

It is with this background that at COP-18, held at Doha in December 2012, it was agreed upon that the TNA process "should be integrated with other related processes under the Convention, including nationally appropriate mitigation actions, national adaptation plans and low-emission development strategies".4 Similar to TNAs, the processes of formulating nationally appropriate mitigation actions (NAMAs), national adaptation plans (NAPs), and low-emission development strategies (LEDS) aim at identifying climate change mitigation and/or adaptation actions in light of the sustainable development priorities of developing countries.5 This implies that although TNAs, NAMAs, NAPs, and LEDS have different roles under the UNFCCC, they could support each other through data exchange, for example, using TNA outputs from one stage as input in a NAMA, NAP or LEDS decision stage. Such integration would not only require coordination amongst the processes at the national levels, but perhaps also at the level of the COP and its bodies. This article describes the areas for possible coordination between TNAs and NAMAs and how these processes could be harmonized with the objective of optimizing processes within countries

* E-mail: jin@jiqweb.org, Website: http://jiqweb.org
1 Decision 4/CP.7, FCCC/CP/2001/13/Add.1, pp. 22–30.
2 Decision 2/CP.14, FCCC/CP/2008/7/Add.1, para 1.
3 See http:/tech-action.org
4 Decision 13/CP.18, FCCC/CP/2012/8/Add.2, paras 10–13.
5 Decision 1/CP.16. FCCC/CP/2010/7/Add.1, para 48.

for climate control and development by efficiently using the resources available in developing countries.

Description of TNA Process

For TNAs, a detailed step-wise process methodology has been developed, which was endorsed in November 2010 by the UN Expert Group on Technology Transfer (EGTT).[6] This makes the TNA methodology so far the only endorsed methodology under the Convention for formulating mitigation and adaptation measures for low emission and climate-resilient pathways.

The TNA process contains two main stages. During the first stage, country stakeholders revisit the country's short- and longer-term sustainable development priorities,[7] which are subsequently used as criteria for identifying those technologies or measures which maximize climate and development benefits against given resources.

For this technology prioritization process, multi-criteria decision-analysis methods are applied along with a technology familiarization step (to avoid the drawback that only selected technologies that stakeholders are familiar with are considered in a TNA[8]). TNA stakeholders are subsequently encouraged to assess technologies at the level of the subsector by asking: At what scale could this technology be implemented within a (sub)sector given its technical potential and how would that contribute to social, environmental and economic development?[9]

The output of this first phase of the TNA process is a portfolio of technologies for climate change — mitigation and adaptation — and development within strategic sectors.[10] It should be noted that the output of this phase of the TNA is not necessarily limited to 'hard' technologies, but could also contain 'soft' technologies or measures such as behavioural change, improved transport operation systems, awareness campaigns, etc.

In the second TNA stage, stakeholders examine how the development and transfer of the prioritized technologies can be accelerated within the country at the scale desired. For this, stakeholders first explore the market or system within which a technology is to be rolled out. From this analysis, system or market inefficiencies or barriers can be identified that would block the acceleration of technology R&D, deployment and diffusion in the country. Subsequently, solutions can be identified and characterized for inclusion in a technology action plan.[11] Common elements for technology acceleration identified across technologies and/or sectors could give input for sectoral and/or national technology strategies.

The TNA process therefore underlines that identification of technologies and possibly implementing them in projects may not be enough to initiate a systemic change for widespread technology innovation in a country. While identification of technologies is an important step in low emission and climate resilient development, overarching strategies will be required to accelerate development, deployment, and diffusion of the technologies in countries' systems or markets.

Interlinkages between TNA and Formulation of NAMAs

Potential Interlinkages between TNA and Formulation of NAMAs

As explained above, TNA results could be used for the formulation of NAMAs as they identify low-emission technologies and other measures in the light of a country's sustainable development objectives as well as climate change imperatives. Currently, there is no established process for NAMA formulation under the

6 The EGTT endorsed the updated Handbook for Conducting Technology Needs Assessment for Climate Change (UNDP 2010) at its sixth meeting on Development and Transfer of Technologies (Bonn, Germany, 19–20 November 2010).

7 The TNA handbook recognizses that stakeholders may have a focus on short-term priorities but explains that due to medium- to long-term climatic change, economic, and demographic trends, priorities may change over time.

8 Information sources used for technology familiarization are http://climatetechwiki.org (an online technology database established for supporting TNAs) and the guidebooks prepared by UNEP Risoe Centre (http://tech-action.org).

9 For example, largely simplified, it may be said in a TNA process: "Given country conditions, concentrated solar power can only cover 5% of the country's annual electricity demand. This would reduce electricity imports and create X new jobs in technology and infrastructure development, but it would require USD Z investment in network stability and back-up electricity production capacity." (example prepared by authors)

10 Within the sectors, technologies can be further prioritized within categories of technology availability in time (short term for technologies at the stage of deployment or diffusion or long term for technologies in research and development and demonstration stages) and applicability in scale (small- and large-scale technologies).

11 The action plan characterizes the actions for technology acceleration in a TNA in terms of: Why is this action needed? How should the measure be carried out? Who should be responsible for the actions and who else should be involved? When would the action need to be implemented? What are the MRV requirements for the action? And how much would this action cost?

Convention[12], so that the interlinkages between TNAs and NAMAs can be diverse. For instance, as argued by Jung *et al*[13], on the basis of an analysis of five pilot NAMA studies, a NAMA could be one technology project, or a set of measures as part of a comprehensive plan, or an overall strategy itself, including actions to improve the functioning of markets or systems for successful development and transfer of low-emission technologies. TNAs could contribute to NAMA formulation at these different levels as:

- Strategies are identified for country-context specific[14] systems of technology development and transfer at the technology, sector and national levels;
- These strategies incorporate activities on capacity-building and finance needs, policies and measures, networks, organizational change, supporting activities for the system, as well as intellectual property rights requirements for successful technology development and transfer; and
- Action plans can be developed for implementing the strategies which allow time planning, allocation of responsibilities and resources, and monitoring, reporting, and verification (MRV) to maximize the benefits.

Based on the possible interlinkages described, Table 1 presents an overview of commonalities and differences between TNA and NAMA processes.

Table 1: Overview of commonalities and differences between TNA and NAMA processes[15]

a. To what extent are TNA and NAMA processes embedded in a country's long-term development vision?	
Commonalities	**Differences**
Common focus on a country's overall sustainable development context	Unlike for TNAs, under the Convention no specific methodologies exist for NAMAs
Strategic (sub)sectors and areas identified in a TNA could be used as inputs for NAMAs	
Processes are generally participatory	
b. How are technologies or measures for mitigation and adaptation in the country identified?	
Commonalities	**Differences**
TNA procedures are in principle suitable for other policy concepts that identify technologies and actions in light of climate policy and sustainable development	TNAs explicitly focus on technology choices. In NAMAs prioritization of technologies is more an implicit step before formulating policy action
Therefore, TNA technology portfolios and technology action plans could be input for NAMA processes	
c. What actions are envisaged for low-emission and climate-resilient pathways?	
Commonalities	**Differences**
There is a common focus on strategic pathways with action plans either at the technology or sector and national levels	Whereas a TNA focuses mainly on technologies and measures for mitigation and adaptation, NAMAs could be more overarching and focus on broader mitigation, adaptation and development issues
NAMA formulation could possibly benefit from the identification in a TNA of actions for acceleration of technologies for mitigation and adaptation	

12 See also M Jung, M Vieweg, K Eisbrenner, N Höhne, C Ellermann, S Schimschar, and C Beyer (2010). Nationally Appropriate Mitigation Actions: Insights from Example Development, with contributions by CTS Mexico.

13 Ibid.

14 Each country has specific national institutional structures and social networks of actors (e.g., technology providers and private project developers). They operate under their respective policies and regulations.

15 This table has been presented by Wytze van der Gaast at the Fifth Meeting of the Technology Executive Committee on 26–27 March 2013 in Bonn (Germany) as part of the Background Paper "Interlinkages between Technology Needs Assessments and National and International Climate Policy-making Processes". Available at http://unfccc.int/ttclear/sunsetcms/storage/contents/stored-file-20130320120301019/Background%20Paper%20interlinkages%20TNA.pdf

How TNAs could possibly contribute to NAMA processes

Based on the above description, the following areas can be identified at which TNAs could contribute to NAMAs[16]:

- *Prioritization of measures*: The TNA methodology can be used for a detailed prioritization of measures to be implemented as NAMAs. This supports the process of embedding NAMAs in national mainstream processes[17]. A key step in this process is technology familiarization to ensure that all possible options are considered during the prioritization.
- *Clarity on scale of implementation*: While several NAMAs have been identified, the scale at which these actions could potentially be implemented within a country is often not clear: at full technical potential, at a scale required for meeting country and/or sector goals, or in the form of a project. TNAs could offer this information as these assume a certain scale of technology implementation (e.g., implementation as project, sector programme, or national strategy).
- *Clarity on climate benefits*: Part of a TNA, during technology prioritization and formulation of action plans, is to estimate how a technology contributes to climate change mitigation and adaptation. This includes an assessment (with sensitivity analysis) to handle uncertainties and data limitations.
- *Identification of actions to accelerate development and transfer of technologies and/or mitigation and adaptation measures*: In a TNA, stakeholders analyse how the development and transfer of priority technologies can be accelerated in the country. This is done by exploring gaps and barriers in the enabling environment (e.g., markets, legal, and regulatory context, public engagement, and international collaboration) for prioritized technologies and by identifying actions to solve these gaps and barriers. The actions thus identified can be characterized in terms of why an action is important, how it should be done, who would be responsible for the action, when the action would need to be implemented, how much it would cost, what the MRV requirements are, etc. Each of these outputs could be considered inputs for a NAMA.

How implementation of TNA process and results could be supported by NAMA processes

Previously, we discussed how TNAs could support NAMA processes. However, TNAs could also benefit from NAMA processes, as follows:

- *Setting targets*: In a TNA, technologies are selected against countries' priorities. Linking TNA processes with NAMAs could imply that longer-term visions developed in the latter processes can be used as a reference in the TNA decision making too. This would also enhance consistency across processes in terms of embedding decisions in national priorities.
- *Ensuring high-level attention and recognition*: The TNA Experience-sharing Workshop held in Bangkok in 2012[18] highlighted the challenge of ensuring that TNA documents receive appropriate attention and are recognized by high-level public and private decision-makers. Owing to the fact that NAMAs in particular have received high-level policy attention and recognition as something that developing countries will do to mitigate GHG emissions, establishing clear process-wise and policy-level interlinkages with these processes could enhance the high-level political recognition of TNAs and the underlying technology transfer benefits.
- *Exchanging data and knowledge*: TNAs could be complicated by lack of data (especially on costs) or limited exchange of data between country institutes. Interlinkages with other processes could support collaboration on data collection, avoid 'data competition' between processes, and help rationalize existing data and other (human) resources across the processes. This would

16 Most of the insights presented in this section have been presented by Wytze van der Gaast at the Fifth Meeting of the Technology Executive Committee on 26–27 March 2013 in Bonn (Germany) with the Background Paper, "Interlinkages between Technology Needs Assessments and National and International Climate Policy-making Processes". Available at http://unfccc.int/ttclear/sunsetcms/storage/contents/stored-file-20130320120301019/Background%20Paper%20interlinkages%20TNA.pdf

17 The aspect of mainstreaming NAMAs in national country priorities has, among others, been highlighted by K Fukuda and K Tamura, 2012. From NAMAs to Low Carbon Development in Southeast Asia: Technical, Mainstreaming, and Institutional Dimensions, IGES Policy Brief, No. 23.

18 FCCC/SBSTA/2012/INF.7, Report on the Experience-sharing Workshop on Technology Needs Assessments.

streamline similar but not identical processes and avoid or reduce 'institutional congestion'.[19]

- *Financing and implementing TNA results*: A key obstacle, with respect to implementation of TNA identified technologies and technology action plans, is lack of financing and, related to that, attracting investors. Should TNA outputs be considered as NAMAs, funding and investment support allocated to NAMAs would also, indirectly, support implementation of TNA results.

Conclusions

The role of TNAs under the Convention is to support innovation towards low-emission and climate-resilient societies in Non-Annex I countries. Based on this work, TNA results can be used as inputs for NAMA processes through exchange of data, outputs, and recommendations. Moreover, integrating TNAs and NAMAs could also support the acceleration of implementing TNA results; for example:

- Data can be allocated more efficiently to the harmonized process steps;
- TNA outputs could receive increased recognition by high-level public and private decision-makers, which would then also support implementation of TNA outputs.

Finally, establishing interlinkages between TNAs and NAMAs — as well as with other related processes such as NAPs and LEDS — would help a country rationalize the outputs from these processes. Non-harmonized processes could result in duplications and 'blind spots' or it could result in a patchwork of — potentially conflicting — messages to policy-makers, financial entities, capacity-building supporters, and other stakeholders.

19 See also M Jung, M Vieweg, K Eisbrenner, N Höhne, C Ellermann, S Schimschar, and C Beyer (2010). Nationally Appropriate Mitigation Actions: Insights from Example Development, with contributions by CTS Mexico.

Comprehensive Support for NAMAs by JICA

*Juichiro Sahara**
Deputy Head and Advisor, Office for Climate Change, Global Environment Department, Japan International Cooperation Agency

Mihoko Kawamura
Climate Change Officer, Office for Climate Change, Global Environment Department, Japan International Cooperation Agency

Japan and JICA's Role for Climate Change Development

Since 1954, Japan has been providing financial and technical assistance to developing countries through Official Development Assistance (ODA). The current Japan International Cooperation Agency (JICA) was inaugurated in October 2008 with the merger of technical cooperation of the former JICA, loan aid operation (ODA loans and private sector investment finance) of the former Japan Bank for International Cooperation, and a large portion of grant aid from the Ministry of Foreign Affairs. JICA provides strategic and effective ODA through integrated, comprehensive, and seamless implementation of technical cooperation, loan aid, and grant aid as one of the largest ODA executing agencies in the world.

According to the Development Assistance Committee (DAC) of the Organization for Economic Co-operation and Development (OECD), the amount of Japan's bilateral financial aid (mostly from JICA) in the field of climate change in 2010 is USD 6.13 billion for mitigation projects and USD 2.26 billion for adaptation projects, which indicates that Japan is the largest donor among OECD DAC members.

Japan is able to contribute to the global challenge of climate change by utilizing know-how accumulated through responses to domestic climate related disasters and cutting-edge technology to promote low-carbon development. The Government of Japan has adopted policies, such as the East Asia Low Carbon Growth Partnership Dialogue and the Hatoyama Initiative which was the major driving force of Japan's Fast Start Finance, to support a wide range of developing countries in alignment with the progress of international negotiations. Based on the policies adopted by the government and by utilizing the experiences, achievements, and technologies of Japan, JICA actively supports measures to tackle climate change in developing countries according to its three principles: (*i*) climate compatible sustainable development, (*ii*) comprehensive assistance using an array of schemes, and (*iii*) collaboration with development and climate partners.[1]

JICA's Comprehensive Support for NAMAs

NAMAs may be good opportunities for developing countries to encourage efforts towards greenhouse gas (GHG) emission reduction, while offering developed countries chances to transfer their technologies and finance.

JICA offers comprehensive support at each phase of capacity-building, preparation (strategy formulation), finance, and implementation of NAMAs. Some of the examples are introduced in the following five sections:

NAMA preparation and project proposal: Achievement in Serbia

JICA conducted a capacity development project (technical cooperation) for NAMAs in Serbia from December 2010 to February 2013 to enhance understanding of MRV and develop the capacity of Serbian government officials to prepare a shortlist of 'MRV-able' NAMAs. In March 2013, a guideline for NAMA development was prepared and uploaded onto the UNFCCC NAMA website[2] as one of the achievements of the project. This guideline provides basic information required in developing NAMAs, such as project evaluation, financial analysis, and MRV methodologies.

* E-mail: gegoc@jica.go.jp

1 "Direction of Low Carbon and Resilient Development Cooperation by JICA". Available at http://www.jica.go.jp/english/our_work/climate_change/pdf/direction.pdf

2 "NAMA Development Guideline of the Republic of Serbia". Available at http://unfccc.int/files/cooperation_support/nama/application/pdf/nama_development_guideline_en.pdf

The notable point is that the guideline explains the process and methodology to develop NAMA projects. The guideline also contains a sample of NAMA Short Description which illustrates the outline of the expected project more concretely than the templates used in the NAMA registry, taking an example of the project for construction of an ultra-supercritical lignite power plant.

Capacity-building: Training in Japan

JICA has provided training programmes under the technical cooperation scheme for years. The training programmes are conducted anywhere from several weeks upto two months on 450 subjects, such as healthcare and social security as well as environment, while inviting more than 10,000 officials and engineers annually from developing countries to JICA training centres in Japan.

NAMA/MRV specific training programmes are offered as three-region-focused courses targeting Southeast Asia and Oceania, Asia, and Africa, with the objective of improving the ability of government officials incharge of climate change mitigation to plan NAMAs through acquiring knowledge and technologies at the field level as well as sharing examples of neighbouring country experiences. At the end of the training, participants are expected to produce an action plan — a draft of NAMAs in an MRV manner — which should be realized after they go back to their home country.

JICA also provides training on individual low-carbon technology. One example is the solar power technology training where government officials from Asia and Africa, including LDCs, learn the technologies and opportunities for introducing solar power.

MRV: Evaluation by JICA

All NAMAs are supposed to be conducted in a measurable, reportable, and verifiable manner. Discussions are being held at various international forums on MRV as the key factor of developing NAMAs, since guidelines for this conundrum have not been provided by UNFCCC yet. The modalities and rigour of MRV may vary because of the diversity of funding sources and type and level of actions (Figure 1).

MRV should not be conducted just for GHG emission reduction or for obtaining credits; it should instead be utilized as one of the tools and indicators to ensure the effective implementation and operation of the project throughout the project lifetime. From this point of view, MRV should also be simple with easily available data.

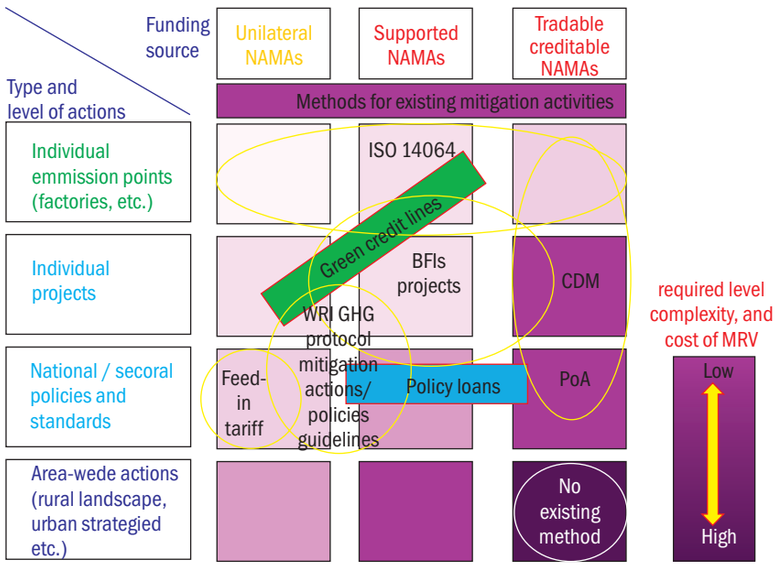

Figure 1: Modalities and Rigour of MRV

Source: UNEP (2012), "NAMA Finance Study". Available at http://www.jica.go.jp/about/direction/globalization/ku57pq00000yadwa-att/NAMA_Finance_study.pdf

Activities assisted by JICA are subject to monitoring and evaluation under the PDCA cycle — Plan (*ex ante* evaluation), Do (implementation and monitoring), Check (*ex post* evaluation), and Act (feedback for future actions) — to manage results, and enhance transparency and accountability.

In 2011, JICA developed the Climate Finance Impact Tool (JICA Climate-FIT)[3] to be used as a reference document to facilitate the consideration of policies and formulation of projects for assisting climate change related measures in developing countries. This tool consists of sections for mitigation and adaptation. In the mitigation section, it offers methodologies for implementing MRV modified from CDM methodologies in a simplified manner on 25 sub-sectors, such as forestry, transport, energy, and so on. It also contains excel sheets for estimation of emission reduction of greenhouse gases. In the adaptation section, this tool provides concepts and guidelines for mainstreaming adaptation considerations into the projects, covering 15 sub-sectors, such as water resources, irrigation, forest preservation, infrastructure, and so on.

Case study: Climate Change Policy Loan in Vietnam

One good example of JICA's comprehensive climate change support is the Climate Change Policy Loan (CCPL).

Different from the conventional project-type cooperation, the CCPL is an innovative scheme to facilitate the implementation of climate change policies through financial and technical assistance for developing countries in alignment with their national development policies and strategies.

The first step of CCPL is formulating the policy matrix consisting of individual actions to be taken and indicators for evaluation of the outcome of the actions through policy dialogues between the host country and Japan. After the matrix is agreed between the two countries, as the second step, a concessional loan is provided for the first phase, instead of disbursing the whole amount in a lump sum. During the first phase, JICA conducts monitoring and also provides advisory services to the host country to secure implementation of their national action plan. After evaluating the achievement of the first phase — and if the progress is found to be satisfactory — the second phase, with a new concessional loan, is agreed upon afresh with the necessary modification of the policy matrix to improve effective, feasible, and tangible policy actions.

Currently, the CCPL programme is conducted in Vietnam under the title of 'Support Program to Respond to Climate Change' (Figure 2), which started in 2010 followed by the second phase in 2011 with the loan amount of JPY 10 billion (around USD 110 to 120 million) for each phase.

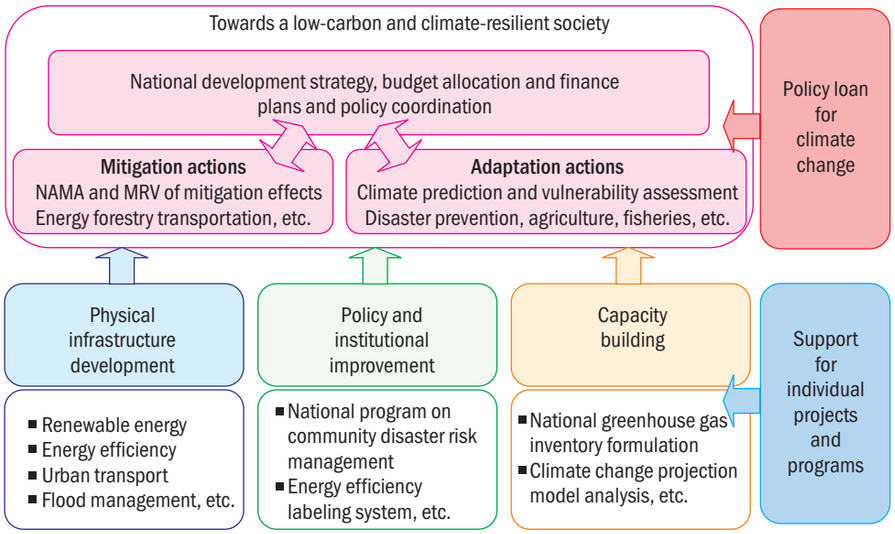

Figure 2: Climate Change Policy Loan in Vietnam

Source: JICA

3 JICA Climate-FIT Draft Ver. 1.0 (June 2011). Available at http://www.jica.go.jp/english/our_work/climate_change/overview.html

Under the CCPL in Vietnam, a national development strategy for climate change is formulated by taking into account budget allocation and finance plans associated with policy coordination. The strategy covers multidimensional aspects of mitigation and adaptation measures, framework of implementation, and evaluation such as NAMAs and MRV, climate prediction and vulnerability assessment, as well as activities of specific sectors, such as energy, forestry, disaster prevention, and agriculture.

In order to realize each activity — energy efficiency, for example — JICA additionally implemented the Energy Efficiency and Renewable Energy Promotion Loan with climate change terms[4], which is highly concessional compared to the general ODA loan conditions. This project targeted mainly energy-intensive industries, including steel, cement, food processing, and textiles, and encouraged them to introduce energy-saving equipment, such as reuse system of waste heat, steam and gas generated during the manufacturing process. JICA directly provided the loan to the Vietnam Development Bank (VDB), which in turn provided these companies with medium- and long-term loans (called two-step loan) for introduction of energy-saving equipment. In addition to the loan, technical cooperation was also provided to VDB towards capacity-building and evaluation of energy-related finance based on Japan's experiences and creating and managing energy-saving and renewable energy device lists.

Partnership: NAMA Finance Report: Insights from bilateral institutions

In 2009, Bilateral Financial Institutions Climate Change Working Group (BFI CCWG) was established to examine financial assistance for supporting climate change actions in developing countries. The current members of BFIs are Agence Française de Développement (AFD), France; KfW Entwicklungsbank (KFW), Germany; Nordic Environment Finance Corporation (NEFCO), Nordic countries; and JICA, with the United Nations Environment Programme (UNEP) as the facilitator.

In fall 2012, BFIs held an international workshop on finance for NAMAs in Helsinki, and produced a report titled *NAMA Finance Study*.[5] The report was released in the NAMA Partnership side event in COP 18 where JICA participated for presentation of the report as the initial member of the partnership. The report highlights perspectives and issues in financing NAMAs. Key insights in this report are that NAMAs should be mainstreamed into national development strategies to make the proposed actions 'nationally appropriate' and that the role of bilateral institutions, including JICA, will be increasingly crucial in promoting NAMAs, as they have longstanding and various experiences of supporting climate change actions by developing countries.

Conclusion

Among the NAMAs submitted to the UNFCCC[6], the type and level of NAMAs varies, from setting emission reduction goals for a certain time period to implementation of GHG reduction projects. Some of the activities, such as expansion of renewable energy strategies and forest conservation, are not new and conducted long before the new framework was introduced. In order to implement activities such as NAMAs, they should be appropriately integrated into the development plan of the host country, which may facilitate international assistance of technology, financing, and capacity building.

Comprehensive support is required covering both upstream policy formulation as well as downstream implementation of specific activities. In this regard, a climate change policy loan may be a good tool to be utilized to lead the transformational impact on the development path of the host country.

MRV should be utilized as a part of the procedure to confirm effective implementation of projects. In addition to clear guidance, development of a simple MRV system is required with necessary modification according to the situation of the country, such as capacity of conducting monitoring and data availability.

JICA, as the main implementing agency of ODA and the largest supporter for climate change mitigation action, will continue to contribute to the climate change responses of developing countries by utilizing the various schemes acquired from long experiences at international cooperation.

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4 'Climate Change ODA Loan' may be applied to Japanese ODA projects which contribute to reduce GHG emissions and to achieve economic growth in a compatible manner, on the basis of policy consultations with Japan. Highly preferential terms (interest rate: 0.2 to 0.6%) are applied compared to general terms (0.7% to 1.7%).

5 See footnote 3.

6 Appendix II - Nationally Appropriate Mitigation Actions of Developing Country Parties. Available at http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5265.php (Accessed on 29 March 2013).

PERSPECTIVE

Normalizing Apples and Pears: Comparing trade-offs for pro-poor Mitigation options in South Africa

*Anya Boyd**
Energy Research Centre, University of Cape Town, South Africa

Imagine the juggling act being asked of policy–makers. In South-African case, on the one hand, government has got to spread limited resources towards meeting the their objective of reducing poverty to 0 per cent and on the other hand, they have to make a U-turn on the country's greenhouse gas emissions. But since poverty alleviation is often linked with development, and development usually translates into increases in emissions, it seems as though they're being asked to do the impossible.

On 4th March 2013, the Energy Research Centre (ERC) of the University of Cape Town hosted a workshop to discuss this critical issue. They asked the important question, what kind of trade-offs are needed for South Africa to deal with the twin challenges of poverty alleviation and slowing climate change related emissions?

The ERC presented their latest research on poverty and mitigation from the group's work under the UNITAR Climate Change Capacity Development[1] partnership and the Mitigation Action Plans and Scenarios programme.[2]

Experts from civil society, academia, private sector, local government, development practitioners, and technology experts were asked to grapple with the following question:

If you are a government with limited funds, how do you spend them in a way that addresses socio-economic challenges in the country, while trying to reduce emissions?

A myriad of national development objectives have been outlined across South African policy, such as job creation, GDP growth, and energy security, to name a few. But South Africa's focus, as a middle income country, is on poverty and inequality. The 2012 National Development Plan set targets to reduce the levels of inequality and reduce the current proportion of 39 per cent of the population living below the national poverty line[3] to 0 per cent by 2030.

At the same time, the national climate goal is to "implement mitigation actions that will collectively result in a 34 per cent and a 42 per cent deviation below its 'Business As Usual' emissions growth trajectory by 2020 and 2025"[4]. While the framework of the Nationally Appropriate Mitigation Actions (NAMAs) progresses on the international front, yet it remains unclear as to how sustainable development objectives will be assessed against the mitigation potential, raising red flags warning us that emission reductions may trump socio-economic development objectives again (as with the CDM).

With climate change mitigation objectives often being perceived to constrain development, and with the risk of NAMAs developing in an emissions-centric manner, how do we make sure the poorest don't get ignored? How can mitigation and poverty reduction be achieved at the same time?

Comparing Apples and Pears

But one of the biggest difficulties in this kind of decision-making is how to compare the socio-economic merits of mitigation actions that are as different from one another as a solar water heating programme is from a public transport initiative. How do you make key decisions around trade-offs between continuing to expand a national economy currently dependent on cheap coal electricity versus building a local renewable energy industry? How do you gauge the 'quality' of a job created?

A Sharpened Tool for the Toolbox: The matrix

In a brave attempt to tackle some of these challenges and trigger a debate amongst experts on these issues, the ERC developed a Mitigation Action Impact

* Email: a.boyd@uct.ac.za

1 www.c3d-unitar.org

2 www.mapsprogramme.org

3 418 ZAR per month/2009 prices

4 Stipulated in the 2011 National Climate Change Policy prepared by South African Department of Environmental Affairs. These numbers depend on suitable technical, financial and capacity-building support.

Matrix (M:AIM) for South Africa based on the AIM tool initially developed by Professor Munasinghe of the MIND institute in Sri Lanka. The matrix allows researchers to combine the government's main development goals with mitigation options. The matrix has been tailored for the South African context, and allows for a comparison between different mitigation actions and their implications on broader socio-economic issues beyond climate change and energy security — including poverty, job creation, and inequality.

The initial thinking is informed by qualitative and quantitative research, namely case studies, macro-economic or so-called CGE modelling, and experts' inputs.

During the workshop, the ERC presented their research case studies, in poster format, for mitigation actions around solar water heating[5] electric passenger vehicles[6] and wind energy[7]. In addition to these three case studies, a study comparing different large-scale electricity generation options of nuclear, concentrated solar power, wind, and photovoltaic technology[8] was also presented.

The purpose of the workshop was to bring together experts to interrogate the application and value of this approach, whilst providing an opportunity for participants from different backgrounds to sink their teeth into some of the unresolved issues.

The discussions focused on the following subjects:

- *Job creation*: Is local manufacturing possible and to what degree (bearing in mind how much China undercuts everybody)? Who are the jobs being created for?
- *Increased electricity costs*: Would increasing private renewable energy installations deprive municipalities of a key revenue stream and thereby increase the price of electricity for the poor?
- *Hidden costs and risks*: We must be sure to reflect the hidden costs and externalities from both renewable and non-renewable energy options (embodied energy, health impacts, decommissioning costs, etc.).
- *Smart (or dumb) grids*: Without the necessary grid capacity, how realistic is large-scale and private-level renewable energy?
- *Beneficiaries*: Even once socio-economic benefits have been estimated and modelled, how are these benefits reaching the poor?

"There are no doubts that these actions can have positive benefits on the poor", noted one workshop participant, "but implementation is the main problem. How do these benefits filter down to the poor?"

The above issues require further debate and analysis, but it is clear that bringing together poverty, development, and climate change will bring apples, pears, and oranges to the surface. At the end of the day, as a workshop participant highlighted, we are dealing with trade-offs that are just impossible to make.

"This is a difficult question, but (this research and workshop is) a very valuable contribution."

5 http://www.erc.uct.ac.za/Research/Otherdocs/AIM%20Poster_SWH.pdf
6 http://www.erc.uct.ac.za/Research/Otherdocs/AIM%20Poster_wind.pdf
7 http://www.erc.uct.ac.za/Research/Otherdocs/AIM%20poster_electrombility.pdf
8 http://www.erc.uct.ac.za/Research/Otherdocs/AIM%20poster_nuclear.pdf

Developing Financeable NAMAs: A Practitioner's Guide[1]

*Jason Dion**
Project Officer and Economist, International Institute for Sustainable Development

*Melissa Harris***
Project Manager, International Institute for Sustainable Development

Dave Sawyer
VP Climate Energy and Partnerships, International Institute for Sustainable Development

Nationally Appropriate Mitigation Actions (NAMAs) are fast becoming the climate finance vehicle of choice to help developing countries transition to low-carbon futures. To support low-carbon, climate-resilient development (LCCRD), the International Institute for Sustainable Development (IISD) recently released a step-by-step guide to help practitioners successfully identify and prioritize NAMAs.

Developing Financeable NAMAs: A Practitioner's Guide is based on IISD's technical expertise and lessons learned from NAMA work in Kenya and 10 Congo Basin countries, as well as test applications in reviews for Bangladesh, and Trinidad and Tobago.

The guide emphasizes the importance of situating NAMAs in the context of broader LCCRD, while contributing to the growing body of NAMA learning by providing:

- A conceptual framework for implementing LCCRD, under which NAMAs can be prioritized
- A step-by-step methodology for screening NAMA opportunities, both within and outside a low-carbon development planning process, with the Quick Screen designed specifically for developing NAMA concepts, and the Deep Screen for developing NAMA proposals

The guide is tailored to produce NAMA concepts and proposals that align with the requirements of the United Nations Framework Convention on Climate Change (UNFCCC) NAMA registry, which is expected to open later this year.[2]

This article provides an overview of the guide, highlighting key elements of success, such as situating NAMAs within development priorities, ensuring government coherence on action prioritization, engaging stakeholders, and orienting the process toward achieving financing.

Setting the Context

NAMAs are a central element of the LCCRD process as they require a focused assessment to identify mitigation actions that align with development priorities. They can be implemented within local realities and signal country-driven priorities for financing. In practice, NAMAs should be a distinct element of any larger development strategy. The main elements of IISD's approach to LCCRD include understanding governance for low-carbon development, envisioning development to accommodate mitigation and adaptation aspirations, and planning for the transition to low-carbon climate-resilient futures.

The focus of IISD's guide is primarily on NAMAs that are useful for the second element, envisioning development to accommodate mitigation and adaptation aspirations. Aligning NAMAs with broader development planning roadmaps and investment prioritization is central to success.

NAMAs are of critical importance for developing countries, given NAMAs' potential for strong linkages between mitigation and adaptation, as well as additional developmental co-benefits. Although challenges exist as the nascent concept of NAMAs

* E-mail: jdion@iisd.ca
** E-mail: mharris@iisd.ca

1 This paper is based on the report Developing Financeable NAMAs: A Practitioner's Guide. For more information on IISD's guide and related projects, please visit www.iisd.org/climate/developing

2 For more information on the UNFCCC registry, refer to http://unfccc.int/cooperation_support/nama/items/7476.php

continues to evolve, early participants have a unique opportunity to influence the process. IISD's *Developing Financeable NAMAs: A Practitioner's Guide* is intended to aid policy-makers and others charged with charting a path forward on NAMA development.

Practitioner's Guide: Two Streams

Key elements contained in the guide include the Concept Quick Screen and Proposal Deep Screen processes, both of which are summarized in Figure 1. Both streams are similar in that they follow the basic trajectory of setting the context, analysing the information collected, developing a long list of potential NAMA opportunities, filtering this to a short list, and then validating and finalizing. The two streams differ primarily in their depth of analysis:

Concept Quick Screen identifies NAMA concepts with potential for climate financing that can be submitted to the registry as 'NAMAs seeking support for preparation'.

Proposal Deep Screen can either analyse the outputs of the Quick Screen further to determine the most appropriate development options to meet country-specific needs, or it can analyse an already-existing list of potential NAMAs. The Proposal Deep Screen produces prioritized NAMA proposals that can be submitted to the registry as 'NAMAs seeking support for implementation'.

Concept Quick Screen and Proposal Deep Screen can either be used independently or in sequence, depending on the country's needs and existing state of NAMA readiness. In this way, the guide is designed with flexibility to adapt to the evolving NAMA process.

Concept Quick Screen

Concept Quick Screen involves five distinct steps. For more information on the process and outputs of these respective steps, as well as illustrative examples, see the Practitioner's guide.

***Step 1*: Research and Categorization:** Collect, review, and categorize information that underlies the identification of NAMA opportunities. This includes relevant documents and data that provide country context, information on GHG emissions, government priorities, and on-going and planned actions.

***Step 2*: NAMA Concept Long List:** Develop a credible long list of possible NAMAs for the country drawn from the information gathered in Step 1. The actions could be policies, programmes, or projects.

***Step 3*: Short List of NAMAs:** Filter the long list to develop a short list of NAMAs that are potentially implementable in the country. The basis for screening the list developed in Step 2 is to look for options that have significant mitigation potential, alignment with government priorities, evidence of existing action, and sustainable development and climate resilience co-benefits.

***Step 4*: Draft Quick Screen Report:** Prepare a report for country stakeholders that outlines the results of the analysis, including the short list of NAMAs. This report can be used to raise awareness of viable NAMA options, to form the basis for discussions with in-country stakeholders, and to serve as the starting point for developing registry submissions.

***Step 5*: Validation and Finalization:** Validate the selection of potential priority NAMAs, including analysis and assumptions, with country experts. Discussions with country experts through the validation process will help to determine if actions align with government priorities, if there is sufficient 'readiness' to prepare and implement the NAMA, if there are barriers that impact the feasibility of NAMA implementation, and if additional actions should be considered in the analysis. Once validation is complete, NAMA concepts can be prepared for submission to the UNFCCC registry, should the country desire.

Proposal Deep Screen

The Deep Screen involves seven steps. See the Practitioner's guide for more information on the specific processes and outputs of each of these steps, as well as for supporting examples.

***Step 1*: Deep Screen Selection:** Identify potential actions for further Deep Screen analysis from the short list developed under the NAMA Quick Screen or the government list of potential priority NAMAs.

***Step 2*: Reference Case:** Identify historical GHG emissions and removals, and project these on to a select date to form the reference case — or the baseline — against which the abatement potential of NAMAs can be demonstrated. The reference case and underlying analysis, assumptions, and calculations are developed in a report. This report can be a useful deliverable for the government, potentially providing an update of historical emissions and input to GHG inventory development. Intergovernmental Panel on Climate Change (IPCC) guidelines are used to develop a preliminary inventory of historical GHG emissions. Emissions in this preliminary inventory are then allocated across the six mitigation sectors identified in Article 4.1(c) of the UNFCCC.

***Step 3*: Additional Quantitative Analysis:** Identify measures and technology options to abate emissions,

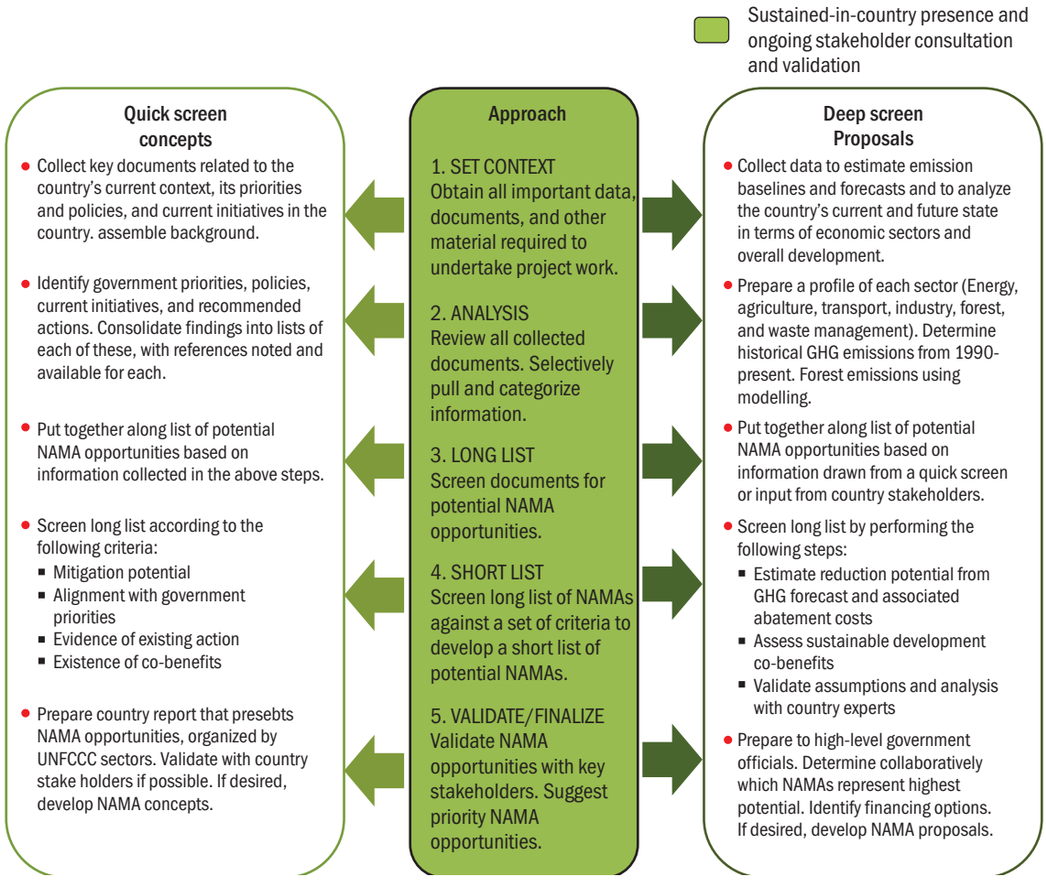

Figure 1: Quick Screen and Deep Screen Approach

and calculate emission reduction potential and abatement costs. A series of reports are produced for each analysed sector that includes information on the low-carbon scenario, the mitigation potentials, and the abatement costs. The work of this step is quite technical. Its main components are reviewing information, collecting and sorting data, developing annualized costs for abatement opportunities, transforming facility and process data to a sector curve, estimating a probabilistic cost curve, assessing co-pollutant releases, and developing finalized wedge diagrams.

***Step 4*: Assessment of Associated Impacts:** Assess the sustainable development and climate resilience co-benefits and potential negative impacts of the identified NAMAs. Qualitative assessment is undertaken in each sector by an expert team, building on previous exercises and experiences to qualitatively assess sustainable development impacts using sustainable development indicators developed by IISD for each of the six UNFCCC mitigation sectors. The sustainable development analysis takes a sectoral approach, allowing comparability across NAMAs within a sector. The team identifies potential adaptation impacts, determining if the NAMA has positive, neutral or negative impacts on climate resilience.

***Step 5*: Financing NAMAs:** Present an initial overview of the possible channels or types of climate finance that might be needed to implement the NAMA. This includes the sources of funding, the instruments, and the barriers to be addressed to ensure successful NAMA implementation. An effort is made to look ahead to NAMA implementation, where barriers to implementation are linked to sources of financing and the instruments to deploy that financing.

***Step 6*: Draft Deep Screen Report:** Present the NAMA information in a comprehensive report with potential priority NAMA proposals identified. The report brings together the analysis developed in Steps 2, 3, and 4, with a chapter developed for each sector analysed. This report can be used to form the basis for

discussions with in-country stakeholders, to provide the evidence base for updates to the GHG inventory, and to serve as the starting point for developing registry submissions.

***Step 7*: Validation and Finalization:** Validate assumptions and analysis with local experts, and revise analysis based on expert inputs. This step involves in-country sectoral stakeholder meetings that include experts from government, the private sector and civil society, who ideally would have been engaged throughout the process. Once a finalized list of prioritized NAMAs is developed through validation with stakeholders, proposals are developed for submission to the UNFCCC registry.

Lessons Learned

IISD has undertaken technical and capacity-building NAMA work in Kenya, Bangladesh, Trinidad and Tobago, and the Congo Basin region. A key insight gleaned from this project experience is the need for the NAMA process to be country driven along with senior-level leadership. Securing senior-level government consensus on NAMA priorities is invaluable for clearing the way for inter-agency cooperation. NAMAs ultimately involve financing priority actions, and, as such, many competing priorities between agencies will emerge through any NAMA prioritization process. Without high-level support and government consensus, the internal NAMA process will likely stall until prioritization is set at the highest levels.

As a core approach, the guide focuses on identifying only those NAMA opportunities that are consistent with the country's priorities as stated in its own planning documentation, and that align well with the work already ongoing in the country. A strong complement is then to ensure an in-country presence to locally validate analysis to ensure that the identified NAMA opportunities reflect known needs and priorities.

Establishing a NAMA process that includes both sound analytics and a country-driven process is central to success. Giving stakeholders a seat at the table from the beginning will help to ensure that the end product is both practical and useful. Stakeholder groups need to be engaged early and often throughout the process — from the initial desk research to ground truth findings to the end point, looking out for omissions — in order to gain perspective into governance realities.

A final key insight is the importance of orienting the NAMA identification and prioritization exercise to produce practical and actionable outcomes, so that countries can proceed with seeking financing. In the IISD's guide, each of the two streams of analysis to produce NAMA concepts and proposals are oriented to deliver submissions to the UNFCCC registry.

Conclusion

The various lessons learned through the IISD's project experience on LCCRD, such as in-country leadership, stakeholder engagement, and gearing the process towards the UNFCCC registry submission as a final outcome, are included as central design features and guiding principles in the Practitioner's guide.

The guide continues to evolve, and is a work in progress. For now, it provides a good starting point for practitioners to operationalize NAMAs. As lessons are learned, and the UNFCCC negotiations provide more guidance on NAMAs — be they supported, unilateral or credited — the guide will be updated. In the interim, the IISD is developing an e-learning course based on the guide to help practitioners learn NAMA best practices through hands-on training. NAMA webinars will be hosted on July 2, 9, and 16 to introduce participants to the courses on Developing a Quick Screen, Deep Screen and Baseline Inventory. IISD expects the full course to be available in August 2013.

BASIC BRIEFS

LCDS–Entry Points to Conceptualizing NAMAs: The Indian case

*Nimisha Pandey**
Associate Fellow, The Energy and Resources Institute

In the recent years, the concept of 'low carbon development/growth' has gained much significance in international climate diplomacy and discourse. Although, the idea of low carbon/low emission development/growth as the new development paradigm was formalized by the UNFCCC process through the Cancun Agreement (UNFCCC, March 2011)[1], based on a common but differentiated approach to meet the overall emissions reduction objectives, the fundamental idea emerges from the underlying philosophy and objectives of the Convention (UNFCCC, 1992)[2]. In the context of the ongoing climate debate, the low carbon development (LCD) hypothesis comes across as a 'soft alternative to voluntary or obligatory greenhouse gas (GHGs) emission reduction targets in developing countries'(Tilburg et al., 2011), as it has the flexibility to accommodate national socio-economic contexts and priorities. In the last few years, several countries, both developing and developed (e.g., Brazil, China, India, Indonesia, South Africa, South Korea, Japan, Germany, Mexico, etc.), have embarked on the process of designing low carbon development strategies (LCDS).

While, there is no internationally agreed upon definition of LCDS, it broadly refers to strategies and actions that are aimed at simultaneously addressing the twin challenges of climate change and development. In general, a country's LCDS comprises select options and actions for LCD in the mid-and-long-term at the national level; sector-specific options and preferred actions for reductions of GHGs; and a roadmap for the implementation of prioritized options at the national and sectoral levels (UNEP, 2011). LCDS is based on the unique socio-economic, demographic, and geographical context of the country; its level of preparedness, capability, and ambition to mitigate GHGs; and its developmental priorities along with priority sectors and preferred actions for GHG mitigation. Thus, a global approach towards framing of LCDS for countries/regions would be ineffective (Tilburg et al., 2011).

The concept of Nationally Appropriate Mitigation Actions (NAMAs) was launched in the international climate policy arena by the Bali Action Plan (BAP) (UNFCCC, 2008)* at the 13th Conference of Parties (COP) (2007). Paragraph 1b ii of the BAP highlighted the need for mitigation actions by developing countries in light of their sustainable development needs, supported and enabled by technology, financing and capacity building, in a measurable, reportable and verifiable manner (UNFCCC, 2008)**. The on-going international climate discourse discusses two main types of NAMAs — Unilateral NAMAs (mitigation actions undertaken by developing countries with their own resources) and supported NAMAs (mitigation actions undertaken by developing countries, supported and enabled by international technology, financing and capacity-building).

* Bali Action Plan is the name given to Decision 1/CP.13, adopted by the COP to the UNFCCC in December 2007 at the 13th COP.

** Decision 1/CP.13, paragraph 1 b ii, document FCCC/CP/2007/6/Add.1

Connexion between LCDS and NAMAs

The concept of NAMAs and LCDS are recent entries to the international climate debate but have gained much traction globally as voluntary instruments for developing countries seeking climate

* Email: nimisha.pandey@teri.res.in

1 'All countries shall prepare Low Emission Development Strategies …nationally-driven and represent[ing] the aims and objectives of individual Parties in accordance with national circumstances and capacities' (Cancun Agreement, UNFCCC, March 2011).

2 According to the UNFCCC, Art. 3.4, 1992: Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.

change mitigation and low carbon growth. Although Cancun Agreements introduced the idea of LCDS in the process of describing NAMAs but as of date no UNFCCC decision has established any formal linkages between the two concepts in explicit terms (UNFCCC, March 2011)[3]. A majority of analytical literature depicts LCDS as the overall framework and strategic context for implementation of NAMAs (Helm, 2011). Consequently, LCDS could facilitate identification, definition, and implementation of NAMAs which essentially means that NAMAs could serve as tools to implement LCDS (UNEP, 2011; Tilburg et. al, 2011). However, it is not necessary that NAMAs are an outcome of strategic planning (in the context of LCDS) of the country and may be governed by immediate gains for the policy maker/project developer (UNEP, 2011). Furthermore, in order to ensure effectiveness of NAMAs in implementing LCDS it is critical that NAMAs are intrinsic to the national developmental priorities, are backed by an efficient institutional framework, and are defined and designed after an intensive assessment of the regions' current and future GHG emission trends, priority mitigation sectors/actions, and cost evaluations of potential NAMAs (Fukuda and Tamura, 2012).

LCDS: Primer for Framing NAMAs

Embedded in national circumstances and priorities, LCDS understandably (and essentially) include options and actions which are nationally appropriate (UNEP, 2011). Thus, LCDS provide the overall framework, long-term vision, and direction for a climate-resilient economy with lower emissions. In that light, NAMAs could certainly emerge as the implementing mechanisms of the strategy. Accordingly, it can be concluded that LCDS is the overarching policy directive-cum-goal, within which NAMAs could be conceptualized, designed, and performed.

India's Climate Goals and the Role of the LCDS and NAMAs

In June 2008, India adopted its National Action Plan on Climate Change (NAPCC) that encompasses a very broad and extensive range of measures, including eight national missions focusing on renewable energy, energy efficiency, clean technologies, public transport, resource efficiency, afforestation/reforestation, tax incentives, research, etc. In December 2009, India made another announcement at the 15th COP at Copenhagen that it will unilaterally and voluntarily aim to reduce the emissions intensity of its GDP by 20–25 per cent by 2020 in comparison with 2005. Consequently, with an objective to align country's developmental priorities with climate goals and create a vision for low carbon, climate resilient growth, an 'Expert Group on Low Carbon Strategy for Inclusive Growth' was established with a multi-stakeholder representation (from industry, think tanks, research institutions, civil society, and government). The Expert Group was mandated to develop a roadmap for India's low carbon development through prioritized actions in various economy sectors[4].

The Expert Group in its interim report brought out in May 2011 recommended numerous strategies in the areas of power, transport, industry, buildings, and forestry for reducing emissions intensity, keeping in mind the 8–9 per cent growth scenarios[5] through 2020. According to the report, the proposed measures can reduce India's emissions intensity by nearly 25 per cent by 2020. It also states that with a more aggressive effort and international support of finance and technology, it is feasible to reduce emissions intensity by almost 35 per cent by 2020 even when the economy grows at the rate of 8–9 per cent annually[6]. The final report of the Expert Group shall estimate the costs associated with the recommended low carbon options (Parikh, 2011; Planning Commission, 2011).

3 Cancun Decision 1/CP.16, para 65.

4 It was envisaged that the recommendations of the Group shall form the core of country's climate strategy for the 12th Five Year Plan (2012–2017).

5 For some sub-sectors such as appliance energy efficiency and buildings energy efficiency, it clearly identifies two separate approaches (determined and aggressive), but for others it lists possible policy measures but does not distinguish whether a given approach would be considered determined or aggressive, a gap that needs to be addressed in the final report.

6 The interim report considers both an 8 per cent GDP growth rate for India as well as 9 per cent GDP growth rate until 2020, and within each scenario looks at what can be achieved on a sectoral basis through 'determined' measures (vigorous and effective implementation of policies that are already in place or currently being contemplated by the government) and 'aggressive' measures (implementation of current policies plus design and implementation of new policies, along with significant deployment of new technologies and increased innovation). In these scenarios, the projections for emissions intensity reductions by 2020, over a 2005 baseline, vary from as low as 23.88 per cent (9 per cent growth rate and determined effort) to 34.40 per cent (8 per cent growth rate and aggressive effort).

Table 1: Projected Emission Intensity Reduction over 2005 levels

Sl.	Growth Scenarios	2005 Emissions	2020 with 8% GDP Growth		2020 with 9% GDP Growth	
	Higher and Lower Ends of the Range		Determined Effort	Aggressive Efforts	Determined Effort	Aggressive Effort
1.	emissions at 2005 Levels (Ml CO_2-eq.)	1,433	4,571	4,571	5,248	5,248
2.	Actual and Projected Emissions (Ml CO_2-eq.)	1,433	3,537	3,071	4,016	3,521
3.	Emission Intensity (grams (CO_2-eq./rs. GDP)	56.21	42.47	36.87	42.79	37.51
4.	Percentage Reduction in Emission Intensity	–	24.44%	34.40%	23.88%	33.27%

Source: Planning Commission (2011: 117)

Subsequent to the release of the Expert Group's interim report and a debate on its proposals, there have been suggestions from stakeholder groups to further strengthen and streamline its deliberations. The strategies need to be made more ambitious in the light of critical government policies such as the Integrated Energy Policy (IEP) and the NAPCC with adequate focus on R&D initiatives, and not merely restate the measures being implemented (or proposed) by concerned ministries/departments (Centre for Science and Environment, 2011). The Ministry of New and Renewable Energy (MNRE) needs to be made an integral part of the process of devising strategies for low carbon growth (Pillai and Ghotge, 2010). Further, the potential role of renewables, especially solar power in the context of the NAPCCC, needs enhanced focus and priority rather than highlighting the merits of energy generation from fossil fuels and nuclear processes (Centre for Science and Environment, 2011; Pillai and Ghotge, 2010; *The Economic Times*, 2011). With regard to the strategies proposed for the transport sector, the Expert Group needs to also consider the potential of inter-modal shifts from air to rail and to waterways (shipping) (Pillai and Ghotge 2010). In the buildings sector, the strategies need to devise steps to tap the immense energy-saving potential of the residential sector and not be limited to commercial buildings (Centre for Science and Environment, 2011).

Nevertheless, the Expert Group's deliberations are certainly a significant initiative towards amalgamating the country's climate concerns with its vision for rapid but sustainable and inclusive economic growth. Moreover, the assortment of options proposed by the group can serve as the starting point for formulating NAMAs for the country. From the menu of measures outlined in the report, a categorization of potential mitigation actions which are nationally appropriate can be worked out. For instance, in terms of type of action (policy, fiscal measures, R&D, etc.), timeframes for implementation (immediate, medium/long-term, etc.), existing or/and requisite mechanisms and resources (political, financial, technological; domestically owned or internationally supported), etc. Furthermore, an intensive evaluation of these prospective NAMAs could provide insights on potential macroeconomic feedback effects and co-benefits, costs involved, requisite political and institutional support, impending barriers — political, financial, technological, etc., — and effective mechanisms to address the anticipated barriers.

Summary of Sectoral Recommendations of the Expert Group

Power

- Demand-side management; e.g., appliance energy efficiency (mandating/promoting energy-efficiency labelling, etc.)
- Supply-side enhancement and efficiency (super critical thermal power plants, integrated coal gasification combined cycles plants, carbon capture and sequestration, natural gas)
- Significant focus on promotion of solar power; promotion of wind power and hydro power
- Extensive thrust on nuclear power

Transport

- 'Avoid-shift-improve paradigm'
- Increasing the share of rail in freight transport
- Promotion of public and non-motorized transport in urban passenger transport
- Enhancement in fuel efficiency of vehicle fleet and its operation
  - Introduction of vehicle labelling/rating systems (on a kmpl basis to enable consumers to make a rational choice, star labelling, fuel labelling, etc.)
  - Launch of minimum efficiency standards
  - Devising corporate fleet-efficiency standards (with mechanisms to penalize non-conformance)
  - Consider imposing an up-front tax on personal vehicles to absorb the benefits accruing from differential taxation while passing on fuel-efficiency benefits to the consumers
  - Equal-pricing mechanisms for petrol and diesel to get rid of price distortions and allow consumers to choose more efficient options

Industry

- Improved energy efficiency in the iron and steel sector (through blast furnace-basic oxygen furnaces, electric arc furnaces and induction furnaces, coke dry quenching, cold rolling, slab casting, COREX and FINEX smelting, and pulverized coal injections)
- Improved energy efficiency in the cement sector (increase in blending percentage, fuel substitution through usage of waste materials, cogeneration)
- Improved energy efficiency in the oil and gas sector (reduction of gas flaring, and reduction of waste in processing and transportation)

Buildings

- Improved energy efficiency in residential buildings (primarily through appliances such as efficient ceiling fans and redesigning buildings to reduce heating and air conditioning load)
- Improved energy efficiency in commercial buildings (design efficiency and day-lighting, insulation, plugging of leaks, use of natural ventilation, better implementation of the currently voluntary Energy Conservation Buildings Code [ECBC] and other green ratings systems like GRIHA and LEED India)

Forestry

- Effective implementation of the National Mission for a Green India (double the area for afforestation by 2020 and raise total forested area to 20 million hectares (ha)
- Increase in above and below ground biomass in 10 million ha of forests/ecosystems, resulting in increased carbon sequestration of 43 million tons CO_2-e annually and increase in GHG removals by India's forests to 6.35 per cent of India's annual total GHG emissions by the year 2020 (an increase of 1.55 per cent over what it would be in the absence of the Mission)
- Enhancing resilience of forests/ecosystems by enhancing infiltration, groundwater recharge, stream and spring flows, biodiversity value, provisioning of services (fuel wood, fodder, timber, NNTP's, etc.) to help local communities adapt to climatic variability
- Development of long-term strategy for carbon sequestration from wood plantations that are periodically harvested for use as timber in furniture and construction industry

Source: Author's compilation from the review of LCC report.

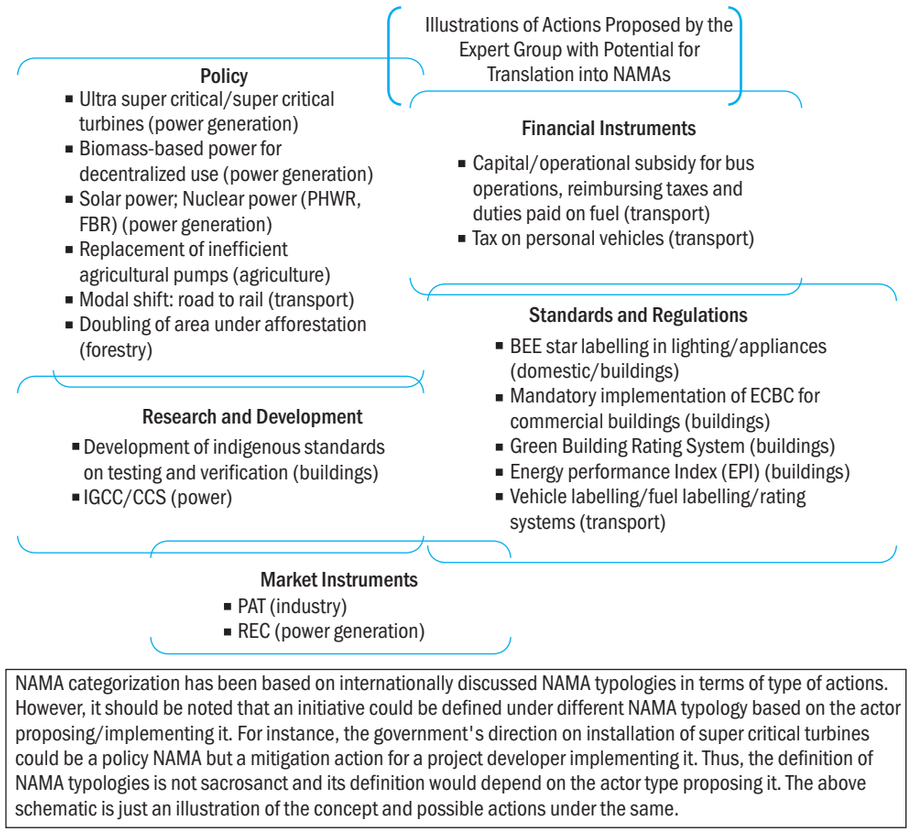

Figure1: Potential NAMA's: An illustration

Source: Author's compilation

Conclusion

The options proposed by the Expert Group have a strategic bearing as they are based on considerations of political and socio-economic factors in line with national priorities. Thus, in the current scenario, the interim report could serve as one of the best entry points for designing NAMAs for the country. A top–down approach (though engaging relevant stakeholders at all stages) for identification and implementation of NAMAs would not only ensure highest degree of political ownership at the domestic front but would also enhance the international recognition (and opportunities for support) received by the country. Furthermore, it can form the basis for articulating international climate support needs of the country in terms of finance, technology, and capacity-building.

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For further details, contact

Neha Pahuja
Centre for Global Environment Research
The Energy and Resources Institute (TERI)
India Habitat Centre, Lodi Road,
New Delhi – 110 003

Tel. 2468 2100 or 4150 4900
Fax 2468 2144 or 2468 2145
India +91 • Delhi (0) 11
E-mail *neha.pahuja@teri.res.in*
Web www.teriin.org