Mobilizing NAMAs and new market mechanisms to harness mitigation in RCREEE Member States Beyond 2012

Countries studies: Jordan, Yemen, Syria, Libya, Lebanon, Algeria, Egypt, Tunisia and Morocco

Final Report

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Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

Contents

Abbreviations .................................................................................................................................................. 2
1. Introduction .................................................................................................................................................. 3
2. Status of NAMAs and new market mechanisms and interdependencies .................................................. 4
3. NAMA potential in RCREEE member states ............................................................................................... 15
4. Strategic considerations for RCREEE member states in engaging on sectoral crediting ......................... 24
5. Possibilities for NAMA/sectoral crediting pilots for further development .............................................. 29
6. Options for RCREEE to get involved ........................................................................................................ 37
7. Conclusions and next steps ....................................................................................................................... 37
8. References .................................................................................................................................................. 38
Annex 1 – Algeria ............................................................................................................................................. 40
Annex 2 - Egypt ................................................................................................................................................ 43
Annex 3 - Jordan ............................................................................................................................................... 45
Annex 4 - Lebanon .......................................................................................................................................... 49
Annex 5 - Libya ................................................................................................................................................. 54
Annex 6 – Morocco ......................................................................................................................................... 56
Annex 7 - Syria ................................................................................................................................................. 61
Annex 8 - Tunisia ............................................................................................................................................. 63
Annex 9 - Yemen .............................................................................................................................................. 67
### Abbreviations

- **BAP**: Bali Action Plan
- **CDM**: Clean Development Mechanism
- **CER**: Certified Emission Reduction
- **CFL**: Compact Fluorescent Lamp
- **DNA**: Designated National Authority
- **EB**: CDM Executive Board
- **EE**: Energy Efficiency
- **ESCO**: Energy Services Company
- **EU ETS**: European Union Emissions Trading Scheme
- **GHG**: Greenhouse Gas
- **IPP**: Independent Power Producer
- **MENA**: Middle East and North Africa
- **MRV**: Measurement, Reporting and Verification
- **MW**: Megawatt
- **NAMA**: Nationally Appropriate Mitigation Action
- **PIN**: Project Idea Note
- **PoA**: Programme of Activities
- **RE**: Renewable energy
- **SWH**: Solar water heaters
- **tCO₂e**: Ton of carbon dioxide equivalent
- **UNFCCC**: United Nations Framework Convention on Climate Change
1. Introduction

The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) has engaged Perspectives Climate Change GmbH (Perspectives) and ALCOR to provide expert advice on the potential for utilising the CDM and the emerging carbon market frameworks currently being discussed in the UNFCCC climate negotiations – that is, Nationally Appropriate Mitigation Actions (NAMAs) and sectoral mechanisms (crediting and trading) to finance energy efficiency and renewable energy projects in the region. The focus of the study is on the RCREEE member states of Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia and Yemen.

This report focuses on the potential for mobilising NAMAs and sectoral mechanisms. A separate report focuses on the potential for utilising the CDM and Programmatic CDM in each of the RCREEE member countries, and includes useful background and an overview of the emissions profile for each country (referred to throughout this report as “the CDM report”). The two reports complement each other and the reader is therefore advised to refer to them in parallel.

This report starts with an overview of NAMAs and the new market mechanisms and their current status in the UNFCCC negotiations, as well as providing a description of current NAMA developments internationally and an overview general characteristics of NAMAs (Section 2).

The report provides a brief overview of the results of the initial screening of NAMA potential for mobilising emissions reductions through energy efficiency and renewable energy in RCREEE member countries (Section 3). More detailed discussions of the individual NAMA opportunities are presented in country Annexes at the end of the report.

While it is recognised that a very wide range of NAMA opportunities could be considered, the primary focus of this report was on highlighting promising and feasible NAMAs in the renewable energy and energy efficiency sectors, given that this is RCREEE’s principal area of interest. Therefore, a number of other important opportunities, for example, reducing fugitive emissions from oil and gas production, were not explored further despite the significant potential in the region for such mitigation actions. Stakeholder comments were invited to inform the NAMA opportunities presented in this report. While every effort was made to incorporate the valuable suggestions received, some of these could not be more fully developed given time constraints.

The report also provides an assessment of the EU policy regarding bilateral agreements on sectoral crediting and the strategic considerations for RCREEE member states in engaging in the negotiations on such mechanisms (Section 4).

The most likely possibilities for the development of a NAMA pilot are assessed based on the options identified in Section 3 (Section 5). Opportunities for RCREEE involvement in such a pilot are discussed (Section 6). Finally, overall conclusions and possible next steps are presented (Section 7).
2. Status of NAMAs and new market mechanisms and interdependencies

NAMAS

The concept of Nationally Appropriate Mitigation Actions (NAMAs) was first introduced at the 13th Conference of the Parties’ (COP) held in 2007 in Bali, Indonesia. The Bali Action Plan (BAP) includes consideration of “nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner” (UNFCCC, 2008).

The concept of NAMAs aligns well with the balance struck between Annex I and non-Annex I efforts enshrined in the UNFCCC, based on the principle of common but differentiated responsibilities and respective capabilities, and that industrialised countries should take the lead in combating climate change. A NAMA specifies voluntary activities of GHG emissions mitigation in developing countries that are not subject to mitigation commitments and can be (but need not necessarily be) supported by industrialized countries through financing, technology transfer or capacity building.

The Cancun Agreements recognize two kinds of NAMAs – those which are implemented using only domestic resources and finance, referred to as “unilateral NAMAs”, and those with international support, referred to as “supported NAMAs”. It is generally recognised that support could be provided through traditional means such as grants, loans and capacity building programmes, but could also be provided through the carbon markets. A NAMA that is supported by creating and selling carbon credits to industrialised countries is generally referred to as a “credited NAMA”. However, the concept of a credited NAMA has been more controversial and it is far from clear when or how a framework for generating credits from NAMAs could materialise. Not all developing countries have been comfortable with the concept of credited NAMAs.

It is useful to think about the different NAMA types as “tiers” that can coexist within the same NAMA framework or sector of the economy. Logically, unilateral NAMAs would target those emission reductions with negative GHG abatement costs, such that a developing country can make use of its low cost abatement options or “low hanging fruit”. It is also generally understood that credited NAMAs would target the emission reduction potential that has higher GHG abatement costs. Financial support provided by industrialised countries under a supported NAMA could either be targeted at lower positive cost options or very high cost options that are not economic for the carbon market to capture. It is also generally understood that support offered by industrialised countries would help cover the incremental costs of the policy or action, but would not go beyond this (that is, would not result in profits being made by the developing country as a result).

While the basic NAMA framework is now emerging, many specific issues remain wide open in the negotiations. Indeed, there is no specific definition of the term NAMA. Many developing countries – including a number of the RCREEE member states – have already made NAMA commitments following the Copenhagen Accord and these and other recent commitments were formally recognized in the Cancun Agreements. The commitments made to date highlight the considerable flexibility offered by the NAMA framework. Aside from the goal of emissions mitigation and the need for MRV, there is almost no limitation for the type of action that could be taken as a NAMA. The actions listed by countries in their submissions to the UNFCCC include different types of targets - national emissions reduction targets in tons, national intensity-based targets, deviations from Business as Usual emissions – and a wide variety of actions - national policies and strategies, sector-focused policy approaches, and specific programmes or projects.

The current work programme of the UNFCCC involves the establishment of a NAMA registry which will serve as a central database of all NAMAs seeking international support, information about available support and support provided. It also includes the development of MRV guidelines (discussed below).

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1 The UNFCCC secretariat has since compiled a list of all communications from non-Annex I countries on the NAMAs to be undertaken. See [FCCC/AWGLCA/2011/INF.1](#).

2 The possibility of linking the NAMA Registry to the Green Climate Fund to match NAMAs with support remains an open question in the negotiations.
Box 1: Key differences between NAMAs and CDM

The concept of a NAMA is different to the CDM in a number of important ways.

- NAMAs are more suited to the implementation of policies, strategies, and programmes, whereas the CDM is implemented at the project level. Programmatic CDM (PoAs) is closer to the NAMA concept, and indeed could provide a starting point for conceptualizing a NAMA.

- NAMAs are most likely to be driven by national governments, and may be undertaken in partnership with the private sector, whereas CDM projects are typically driven by firms involved directly in the carbon markets.

- Supported/credited NAMAs do not at present have any specific additionality rules, whereas the CDM has strict rules for testing each project for additionality.

- CDM projects generally have quite stringent MRV requirements that require demonstration of emissions reductions, whereas NAMA MRV requirements could vary significantly depending on the nature of the activity and the financing approach.

- NAMAs will not necessarily result in credits, whereas the CDM is designed to result in the creation of offsets (CERs).

Sectoral Mechanisms

The BAP also called for the consideration of “various approaches, including opportunities for using markets, to enhance the cost-effectiveness, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries” (UNFCCC, 2008). This started discussions about the potential for scaling-up the existing carbon market mechanisms, and more specifically the CDM. The discussion of introducing new market-based mechanisms is driven by:

- The need to increase the scale of global mitigation action – sector-based mechanisms are seen as a way of gradually increasing the involvement of developing countries in global mitigation efforts, and encouraging developed countries to take on greater mitigation commitments by enhancing the cost-effectiveness of mitigation action.

- The possibility for accessing abatement opportunities that have not yet been exploited through the CDM – with its project-based approach, the CDM is not suited to supporting policy implementation or mitigation action at the sectoral level.

- The potential for addressing some of the perceived shortcomings of the CDM – in particular the fact that, as an offset mechanism, CDM projects do not result in net global emission reductions.

The two main proposals that have been discussed in the UNFCCC process are commonly referred to as “sectoral crediting” and “sectoral trading”. The main proponent of these two models has been the EU, with support from a number of other industrialised countries, as well as a number of emerging economies. The developing country parties that have shown interest include Korea, Mexico, Turkey and a number of Latin American middle income countries such as Colombia, Chile and Peru. Importantly, the decision to implement new market mechanisms would be taken on a voluntary basis.

Sectoral crediting centres around the idea of setting a baseline, or emissions benchmark, for an entire economic sector, or “broad economic segment” (EC, 2011c), and allowing the national government to earn credits for going beyond the emissions reductions required to meet this benchmark. The most discussed model would not impose binding obligations to meet the benchmark, which has thus become known as a “no-lose” target. That is, if the sector’s emissions exceed the level set by the no-lose target when measured, no sanctions would apply. The target could in theory be based on emissions intensity (eg. tonnes CO2_e/MWh) or absolute emissions. The EU proposal is based on a requirement that emissions reductions achieved up to the no-lose target would not result in credits.
being created. These reductions would represent the implementing country’s contribution to global mitigation action. Further, because the baseline is to be set below BAU emissions it would thus result in net global emissions reductions.

It would be entirely up to the national government to decide on how to encourage emissions reductions within the sector – it could, for example, offer to pass through any credits earned, or offer other incentives such as tax breaks or subsidies. However, all of these measures would be likely to entail a degree of risk that the overall sectoral performance is inadequate to beat the target. That is, unless the government forces individual entities to comply with regulations.

Figure 1: Sectoral crediting against a no-lose target

Sectoral trading is based on the cap-and-trade model, which for example the European Emissions Trading Scheme (ETS) is based on. However, the concept is that the cap and trade model would first be implemented at the economic sector level as an interim step towards a national emissions cap. Unlike sectoral crediting, sectoral trading would most likely require binding reduction targets being placed on the national government, since the government would be issued with emissions allowances up front, rather than credits issued ex-post.

As illustrated in Figure 2 below, the allowances would be issued to the government up to the level of a pre-defined emissions cap, which would also be set below BAU. It is most likely that the cap would be calculated in terms of absolute tonnes of CO₂-e. Logically, the government would also transfer the obligation to achieve emissions reductions to firms or installations within the sector, and with this obligation it would either issue domestic allowances tied to the international allowances or transfer ownership of the international allowances. In either case, if the sector fails to meet the emissions reduction target overall it would be difficult to claw back oversold allowances, which is why sectoral trading is more suited to being implemented as a compliance mechanism. While there has been little support to date from developing countries in the sectoral trading model in the UNFCCC negotiations, countries such as Mexico, China, South Korea and Taiwan have been considering the introduction of cap and trade systems at the domestic policy level. The distinction between measures being considered for national policy implementation and the international climate framework is an important one, however, and it is not suggested that the two are necessarily linked in any way.
Compared with the NAMA concept, the discussions on sectoral mechanisms have made less progress in the UNFCCC negotiations. In Cancun, the Ad Hoc Working Group on Long-term Cooperative Action (AWG LCA) agreed to consider the establishment of one or more market-based mechanisms at COP17 in Durban, and invited further submissions from parties. On the positive side, the submissions suggest that there is growing support amongst some developing countries for new market-based mechanisms as a complement to the existing CDM. However, the submissions also highlight the divergence of views on the details. The establishment of any new mechanism is highly conditional on agreement being reached on higher order issues such as the level of ambition of developed country pledges and the question of a second Kyoto Protocol commitment period.

In recognition of the capacity building needs of countries that could be interested in implementing market-based schemes, financial and technical support is being provided. The implementing country participants in the World Bank’s Partnership for Market Readiness (PMR) are Brazil, Chile, China, Colombia, Costa Rica, India, Indonesia, Jordan, Mexico, Morocco, South Africa, Thailand, Turkey the Ukraine and Vietnam. The Moroccan PMR funding, for example, was requested to help build and improve MRV processes, including the establishment of a permanent GHG information and monitoring system; for the identification, development and crediting of NAMAs, and related capacity building reinforcement (Moroccan Ministry of Economic and General Affairs, 2011).

**Relationship between NAMAs and sectoral mechanisms**

There are a number of similarities between the concepts of NAMA crediting and sectoral crediting. Both envisage credit generation for emissions reductions linked to large-scale policy or programme implementation. Both would require high quality emissions data for the setting of appropriate emissions baselines, and stringent MRV rules. Both would tend to be most appropriate for financing abatement opportunities further up the cost curve, via the sale of the credits generated. From this perspective, the implementation of sectoral crediting could simply be considered a NAMA in itself. However, since the concept of a NAMA is very flexible, carbon market finance for mitigation activities within a sector is likely to be complementary to domestic actions (funding, regulations, programmes) and potentially other forms of international support (loans, grants or capacity building). Thus it may be more useful to think of a sectoral mechanism as one possible means of financing a NAMA. For simplicity we mainly focus on describing opportunities in terms of the NAMA framework in the rest of this report, noting that a NAMA that lends itself to crediting may also be able to be conceived in terms of sectoral crediting. In Section 4 we specifically consider the strategic implications of engaging with the EU on bilateral agreements related to sectoral crediting.

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3 That said, China did not support the EU proposal in its submission and a number of countries did not to make a submission, including Brazil and India, which have previously also expressed concerns.
4 This is articulated by the EU in its most recent submission (Hungary on behalf of the EU, 2011)
**General characteristics of NAMAs**

A recent study to examine the NAMAs revealed that the level of detail available on each country’s commitment varied considerably, with very little information being available in some cases and highly detailed concepts already developed in others (Sterk et al, 2011). While there are no rules defining what a NAMA is, the key building blocks for a well-fleshed out NAMA concept could be described as including the following:

**Scope** – the sectoral scope of the mitigation action (eg. electricity, cement, buildings)

**Geographic boundary** – could be national, regional, municipal etc

**Actions to be undertaken** – defining the mitigation goals (eg. emissions reductions) or actions (could be actions that lead to direct reductions, such as retrofitting housing stock, or have indirect effects, such as information, or training plumbers and electricians)

**Defining the required support for these actions** – this may be in the form of finance, technology and/or capacity building (finance could involve crediting)

**Timeframe** - for design, implementation and achievement of actions (and emissions targets, if applicable)

**MRV Framework** - measuring, reporting and verifying the actions to be undertaken; achievement could be expressed in GHG terms, but may not be (see MRV discussion below for more detail)

**Institutions** - key organisations to be involved in the design and implementation of the NAMA; would involve public institutions and possibly private sector partners, could be both domestic and international.

Many of the practical NAMA concepts currently being explored do not yet contain all of the above building blocks. Table 1 provides a number of high level examples of NAMA concepts being developed in a number of countries. The proposed NAMAs for Mexico and Tunisia are then presented in greater detail in Table 2 on the following page – these are among the most advanced/concrete examples available at present.

**Table 1: Examples of NAMA concepts current being developed internationally**

<table>
<thead>
<tr>
<th>Country</th>
<th>Sectors</th>
<th>Partner countries</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>Buildings</td>
<td>Germany</td>
<td>Detailed concept stage</td>
</tr>
<tr>
<td></td>
<td>Transport</td>
<td>Germany</td>
<td>Early concept stage</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Energy, Waste</td>
<td>Germany</td>
<td>Detailed proposal, Outreach to donors</td>
</tr>
<tr>
<td>Peru</td>
<td>Solid waste</td>
<td>Nordic countries</td>
<td>GHG inventory and identifying NAMA options</td>
</tr>
<tr>
<td></td>
<td>(NOAK-NEFCO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>Cement sector</td>
<td>Nordic countries</td>
<td>Developing support scheme for mitigation options</td>
</tr>
<tr>
<td></td>
<td>(NOAK-NEFCO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>Energy</td>
<td>Germany, United</td>
<td>Detailed feasibility study completed</td>
</tr>
<tr>
<td></td>
<td>Kingdon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>Sustainable peat land management</td>
<td>Japan</td>
<td>Feasibility study completed</td>
</tr>
<tr>
<td>Laos</td>
<td>Urban transport</td>
<td>Japan</td>
<td>Feasibility study underway</td>
</tr>
</tbody>
</table>

### Table 2: Overview of advanced stage NAMA concepts

<table>
<thead>
<tr>
<th>Country</th>
<th>NAMA short title</th>
<th>Boundary, Scope</th>
<th>Actions</th>
<th>Type of NAMA</th>
<th>Timeframe</th>
<th>MRV</th>
<th>Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>supported NAMA for energy efficiency in Mexican residential buildings</td>
<td>National Residential buildings sector</td>
<td>Up-scaling of existing schemes through increased subsidies and ambitious efficiency standards plus various indirect measures</td>
<td>Unilateral, supported NAMA (financial, technical, capacity building)</td>
<td>Preparation 2011-12</td>
<td>Whole of building benchmarking approach for measurement of GHG emissions reductions</td>
<td>CONAVI, SEMARNAT, BMU (Germany), Perspectives GmbH</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Solar Plan</td>
<td>National Electricity sector, buildings sector, transport sector</td>
<td>Comprehensive package of 40 measures including energy efficiency in transport and buildings, expansion of solar and wind capacity, interconnection with Italy and various studies</td>
<td>Unilateral, supported NAMA (finance), credited</td>
<td>Measures to be implemented by 2016</td>
<td>Indicators are linked to installed technology – solar collector surface installed (m²), wind capacity installed (MW), PV panels produced, lightbulbs installed etc</td>
<td>MEDD (Tunisian Ministry for the Environment and Sustainable Development), ANME (Tunisian Energy Agency), GIZ (Germany), Ecofys, bifa environmental institute</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Biowaste treatment</td>
<td>National All forms of biowaste other than municipal solid waste (MSW)</td>
<td>Treatment of biowaste from most sources other than MSW – agriculture, food production, restaurants and hotels, sewage and wood waste. Direct measures include plants, studies, concepts, awareness and capacity building, training, norming and standardisation</td>
<td>Unilateral, supported NAMA</td>
<td>Studies, scientific research 2011-12 Programme implementation 2012-16</td>
<td>Based on milestones linked to each measure – eg. studies – i) commissioned, ii) completed; awareness building – i) multiplicators indentified; ii) communications campaigns developed</td>
<td>MEDD, National Agency of Waste Management (ANGED), ANME, GIZ, Ecofys, bifa environmental institute</td>
</tr>
</tbody>
</table>
Practical methods for identifying and developing NAMA concepts

There are two broad approaches that could be used for identifying and developing a NAMA: top-down - on the basis of national commitments, strategies and policies; or bottom-up - on the basis of experience with existing CDM projects, specifically PoA projects. A combination of the two approaches is also conceivable.

**Top-down: policy → NAMA**

In this approach, the existing policies, strategies, programmes or regulations in place act as a starting point for the investigation, selection and design of potential NAMA opportunities. The assumption is that the top-down approach is driven by the domestic government, which has already established the political will to take mitigation actions.

**Step one:** The government reviews its existing policy framework to try to identify further, or untapped opportunities that could lead to additional mitigation potential in sectors already known to be relevant for low carbon development in that country. For example, it could enhance existing measures by expanding their scope, ambition or geographical coverage, speed up the timeframe for implementation through training programmes or funding for investments, or improve effectiveness by tightening up compliance and enforcement.

**Step two:** Then the government would assess the mitigation potential of these untapped opportunities. It would also look for co-benefits – for example, where greenhouse gas abatement can be complementary to economic development. This step would benefit from the involvement of national stakeholders to gain broad support for the NAMA.

**Step three:** The next step is to identify the requirements that would need to be met for the opportunities to be conceptualized as a NAMA. This would include the financing and technical capacity needed, and hence the type of support that could be appropriate - financing, capacity building and/or technology transfer. It would also include identifying the MRV requirements for each action.

**Step four:** The government would then identify the best options based on selection criteria, establish a shortlist and select an action or set of actions for further development.

**Step five:** Next is the formulation of the preferred NAMA option, including specification of the different building blocks discussed earlier (scope, MRV, type of support etc). The NAMA would also be communicated to the international community by registering it on a Schedule under the Cancun Agreements.

**Step six:** Once formulated and identified as a NAMA, the government would be in a position to engage with international donor agencies and commence capacity building for its implementation.

**Figure 3:** Steps for a top-down NAMA identification and selection process
In the Supported NAMA Design Concept for Energy-Efficiency Measures in the Mexican Residential Building Sector, Perspectives developed the NAMA concept on the basis of existing Government policies and a commitment to the NAMA concept.

In 2009 Mexico announced its Special Climate Change Programme (PECC) that defines more than 100 greenhouse gas (GHG) mitigation actions to reduce a total of 51 Mt CO\textsubscript{2}e by 2012 across the country. This includes the “Efficient housing and green mortgages” programme, which has been conceptualised and developed by the National Housing Commission (CONAVI) and is run by the National Workers’ Housing Fund (INFONAVIT).

CONAVI estimates the current Mexican’s housing stock at 27 million houses. The demand for new houses is expected to reach about 20 million for the period between until 2030.

The Mexican Government sees NAMAs as an important means of supporting the goals laid out in the PECC. The NAMA is aimed to enhance GHG emissions reductions of two existing programmes:
- “Ésta es tu casa” - subsidies are given by CONAVI to the housing developers who could achieve a set of minimum energy efficiency criteria for Greenfield development or refurbishments targeting low-income groups
- “Green Mortgages” programme - provides an additional credit line to buy new houses which incorporate technologies such as SWHs, CFLs, water saving faucets and thermal insulation

The transformation of these programmes into a holistic urban planning process including mandatory building codes would further increase emissions reductions through:
- increased penetration (more houses covered during the same time) and/or
- technology up-scaling (more ambitious efficiency standards and/or inclusion of technologies that are currently not covered such as PV systems)

The baseline annual penetration rate of the “Green Mortgage” and “Ésta es tu casa” programmes amounts to 20% of new houses, or 120,000 houses in 2010. CONAVI’s forecast for 2020 is 121,000 houses under the “Green Mortgage” and 95,000 subsidies for ”Ésta es tu casa”, i.e. a total of 216,000 houses covering 37% of eligible new houses. Cumulative coverage would reach 2.0 million new houses with 4 million new houses not covered.

The benefits of enhancing the programs through a NAMA framework were identified as including:
- Additional emissions reductions – estimated to be 9.5 MtCO\textsubscript{2} if 100% penetration is reached by 2020 (Scenario 1) and 17.1 MtCO\textsubscript{2} if 100% penetration is reached by 2015 (Scenario 2)
- Cost savings to households (reduced energy bills)
- Cost savings to government (reduced subsidies for energy consumption).

The suggested MRV procedures for the NAMA are based on the development of a whole-building energy performance benchmark expressed in GHG emissions per gross floor area (tCO\textsubscript{2}e/m\textsuperscript{2}). Average of residence units built in the last five years for baseline.

Financing for the accelerated roll out was estimated to reach a cumulative incremental total of € 1.66 billion to 2020 in Scenario 1 and € 4.07 billion in Scenario 2. Supportive actions for NAMA implementation are estimated around € 15 million in total until 2020.

The supported NAMA would be most likely funded through bilateral cooperation, linked to fast-track finance pledges. A NAMA fund could centralize all the financial resources received from donors, the private sector and the Mexican government. The NAMA could be most likely to attract private investors interested in low-risk and low-return investments, but which can reach high volumes.
**Bottom-up: CDM PoAs → NAMA**

In this approach, the government can use the existing experience with CDM PoAs as the foundation on which to develop the critical NAMA building blocks described above. PoAs are more suited to up-scaling to NAMAs than traditional CDM because they are intended to support the implementation of policies and have a broader sectoral approach.

The assumption in this case is that there are existing PoAs in the pipeline which can provide the starting point. Policies, strategies, programmes and/or regulations can be put in place or adjusted to build on the critical elements of the PoA, scaling it up under a NAMA framework.

The following steps were developed by South Pole Carbon Asset Management Pty Ltd (South Pole) in a recent study for the German development bank KfW, in which PoAs in four countries – Uganda, India, Nepal and Tunisia – were assessed (Puhl et al, 2011):

**Step one:** identify PoAs (registered or in the pipeline) in the country, and review the scope, management structure, implementation arrangements, fit with existing policies and regulations and source of emissions reductions.

**Step two:** analyse operational design elements with regard to their applicability to the design of a NAMA:
- Can the PoA eligibility criteria help define the scope of the NAMA?
- Can the baseline methodology be applied to help define NAMA emissions reductions?
- Can the PoA MRV procedures could be used to develop an MRV framework for the NAMA?
- Can the existing PoA management structure play a role in the implementation of the NAMA?

When assessed, the case studies indicated that some of these elements may be directly transferable, while others may require adjustment. Some PoA elements may not be suitable and would require starting from scratch.

**Step three:** evaluate the institutional framework to establish if there is political will and sufficient institutional capacity to implement policy needed for a NAMA. In this step, the potential for co-existence of PoAs and NAMAs is also explored, considering problems such as double counting.

**Step four:** overall assessment of feasibility of scaling up from a PoA to NAMA and outline of main NAMA design elements based on the bottom-up assessment.

**Box 3: Ugandan renewable energy PoA**

This PoA involves supporting the development of small hydro and other renewable energy projects with capacity below 15MW in Uganda and neighbouring East African countries. Based on the above steps, South Pole assessed that all the critical PoA elements were either applicable or adaptable to the NAMA framework:

<table>
<thead>
<tr>
<th>Eligibility criteria</th>
<th>Adaptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline setting</td>
<td>Applicable</td>
</tr>
<tr>
<td>MRV procedure</td>
<td>Applicable</td>
</tr>
<tr>
<td>Management structure</td>
<td>Adaptable</td>
</tr>
</tbody>
</table>

Overall, the PoA provides a good basis for scaling up from the PoA design to a NAMA. The main question marks are firstly, the unknown state of Uganda’s political commitment to the implementation of NAMAs and secondly, the fact that as an LDC Uganda could still benefit from implementing projects as PoAs post 2012 due to the EU’s preferences. Thus there may be little incentive to pursue the implementation of mitigation measures in this sector under the NAMA framework in the near term.
The MRV challenge

The development of a MRV framework for NAMAs has been a highly contentious issue in the UNFCCC negotiations. Generally speaking, developing countries prefer a voluntary, domestic MRV scheme, while developed countries insist on MRV by international experts if support is to be provided. The development of a MRV framework can be seen both as a challenge and as an opportunity for capacity building and identification of abatement opportunities through the gathering and reporting of emissions information. Data shortcomings have been recognized in many studies, including those that have explored NAMA opportunities as well as opportunities for implementing sectoral mechanisms in countries such as China, Mexico, Brazil (see CCAP, 2010 for example).

The Cancun Agreements provide the basic institutional framework for MRV of both mitigation action and support provided for such action. However, the work to further develop and operationalise the MRV framework is ongoing. The current UNFCCC secretariat work programme includes the development of modalities and guidelines for:

- Facilitation of support to nationally appropriate mitigation actions through a registry
- MRV of supported actions and corresponding support
- Biennial reports as part of national communications from non-Annex I Parties
- Domestic verification of mitigation actions undertaken with domestic resources
- International consultation and analysis

Because the range of possible activities that could count as a NAMA is wide, the associated MRV requirements will also vary widely. There is no “one size fits all” approach – for example, in measuring impacts, the appropriate metric could be inputs, intermediate outputs, GHG reductions or other indicators such as number of staff trained, MW installed, or studies completed, depending on the type of activity. NAMAs need not specifically be based on GHG emissions reductions unless the activity is to result in credits. For many activities such as R&D programmes, studies and information provision it will be very difficult to MRV based on outputs, and crediting is unlikely to result.

It is generally assumed that a credited NAMA under the UNFCCC will need to be subject to a more stringent MRV and additionality framework than it will be the case for supported NAMAs. The rationale is that the credits will be eligible for compliance with emission reduction targets of developed countries (or liable entities within an emission trading scheme). MRV for credited NAMAs would thus necessarily need to be based on GHG emissions outcome. Thus the requirements for MRV and additionality within a credited NAMA might not differ conceptually to a large extent from the current requirements under CDM. In the case of a unilateral NAMA, the MRV rules may be set domestically, keeping in line with international guidelines (eg. the GHG accounting guidelines of the IPCC). The level of stringency for a supported NAMA is likely to sit somewhere between the stringency required for a unilateral NAMA and a credited NAMA, however, the preferences of individual donor countries are also likely to vary in this respect.

Table 3 provides a high level overview of the differences in MRV requirements for the different NAMA tiers.
Table 3 Overview of NAMA MRV requirements

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Unilateral</th>
<th>Supported</th>
<th>Credited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of finance</td>
<td>To be financed domestically</td>
<td>To receive international finance, capacity building or technology transfer</td>
<td>To receive payment in return for carbon credits</td>
</tr>
<tr>
<td>MRV requirements</td>
<td>Domestic MRV in accordance with guidelines developed under the UNFCCC.</td>
<td>MRV according to international guidelines - yet to be developed under the UNFCCC</td>
<td>MRV according to international guidelines - yet to be developed under the UNFCCC</td>
</tr>
<tr>
<td></td>
<td>“National standards” appropriate for NAI</td>
<td>MRV according to international guidelines - yet to be developed under the UNFCCC</td>
<td>Likely to draw upon CDM methodologies</td>
</tr>
<tr>
<td>Level of stringency and scrutiny</td>
<td>Lower</td>
<td>Higher</td>
<td>Highest</td>
</tr>
<tr>
<td></td>
<td>Depends on national standards adopted</td>
<td>Designed to provide confidence to financiers</td>
<td>To provide confidence to the carbon markets and ensure environmental integrity</td>
</tr>
</tbody>
</table>

Double counting issues

Double counting issues will arise if there are new or existing CDM projects within a sector that is also being targeted with a policy or set of policies under a NAMA framework, or to be covered under a sectoral mechanism. Existing CDM projects will generate CERs which should not be counted as also resulting from the NAMA activities. These CERs can be excluded from the calculation of a GHG baseline of a NAMA by subtracting the amount of CERs issued for the CDM projects from the amount of emission reductions achieved by the NAMA.

First consider the case of a unilateral NAMA (introduction of domestic policy measures without financial assistance or crediting). The new measures will impact on CDM projects because it will mean that the emissions baselines against which CDM projects in that sector are credited should logically tighten over time. The policy-based actions are thus likely to make CDM projects in the sector less attractive (Jung et al. 2010). At present under the CDM, the E-/E+ rule applies to avoid discouraging countries from introducing such policies. When calculating CDM baselines, project developers are able to ignore the impact of policies that reduce emissions. Logically, this rule would have to be applied to unilateral NAMAs as well, because otherwise there would be a disincentive to introduce such a NAMA. However, at some point, new CDM projects – assuming the country continues to be eligible for the CDM and the CDM exists - should logically face tightening baselines so that the emissions reductions being credited are still additional. This is more likely for countries with higher levels of development than for poorer ones.

Treatment of double counting in the case of supported and/or credited NAMAs is more complex. The practical suitability of incorporating CDM activities within a credited NAMA will depend on the exact scope of the credited NAMA, the associated MRV and additionality framework as well as on the approach of the relevant CDM methodology underlying the CDM project. Most of the approved CDM methodologies currently assume a business-as-usual (BAU) baseline from which GHG emissions are reduced at a single project-level. As credited NAMAs will require ambitious baselines, significant conceptual challenges arise if CDM projects based on BAU baselines and credited NAMAs are to coexist in the same sector. A possible solution could be a MRV methodology within the credited NAMA which is based on an ambitious benchmarking approach for establishing the baseline, while the country would notify this benchmark as standardized CDM baseline to the CDM EB. This approach has the advantage in that a benchmark can be used to address both baseline emissions and additionality determination for the credited NAMA as well as for single CDM projects. CDM project development could then theoretically be utilised within the credited NAMA framework to generate emission reductions for the NAMA. In this case, the host country government might commit to pass on the credits to the CDM project developers that bring about the reductions - in the RCREEE member states, for example, this might be considered to encourage the development of solar projects.
As discussed earlier, a supported NAMA MRV and additionality framework can potentially be less stringent than for credited NAMAs. This is especially the case, if the supported NAMA entails measures for which the GHG emission reduction benefit cannot be directly monitored and only input-based and intermediate output-based MRV indicators are applied under the NAMA (e.g. for development and enforcement of mandatory standards (e.g. building codes) or certain capacity building measures). For instance, introduction of a mandatory regulation on building energy performance would lead to a reduction of emissions from buildings. As stipulated in several approved CDM methodologies, such a mandatory regulation will need to be taken into account in the baseline determination and may significantly reduce the potential of energy-efficiency projects under CDM.

In the case of a supported NAMA framework on the other hand, it seems advisable to prevent double-counting between emissions reductions mobilised by donor support and by CDM projects in the early design phase of the supported NAMA as much as possible (Wehner et al., 2011). It would be straightforward to argue that no new CDM projects shall be registered in the sector in which a country decides to implement a sector-wide NAMA. If there are concerns about this reducing the CDM attractiveness of the host country, it might be worth using a NAMA-financed emission level as the baseline for future CDM projects or following a similar approach as proposed above for incorporating credited NAMAs and CDM projects.

Sectoral mechanisms present similar challenges discussed for credited NAMAs. If CDM projects are issued with CERs in a sector that is to become subject to a crediting mechanism, there will be double counting of emissions reductions unless the credits to be issued by the sectoral mechanism are reduced by the number of CERs issued in the sector. In theory, this could be done towards the end of the crediting period, by adding up all of the CERs issued and deducting them. This would be another source of uncertainty for the firms involved in the sectoral mechanism. In the case of RCREEE member states with few CDM projects, this may be less of a concern.

In the case of a sectoral trading mechanism, the cap should be reduced accordingly, to reflect emissions reductions that would be expected to result from CDM projects. This may be quite difficult to do on an ex-ante basis since it can be hard to predict the performance of CDM projects. Setting aside a conservative amount of allowance units to allow for maximum estimated issuance of CERs throughout the compliance period may be sufficient in the case of countries with few CDM projects.

3. NAMA potential in RCREEEE member states

Potential NAMA opportunities were identified in each of the RCREEE member states. This section briefly outlines the approach taken and presents the results. More detail is provided in the Annexes. Additional detailed background on the emissions profile and climate policy developments in each of the RCREEE member states is also provided in the CDM report.

It should be noted that these are not fully-developed NAMA concepts, but simply a list of opportunities identified during the country studies, and selected on the basis of an initial screening of opportunities which took place as part of the country studies and in the development of this report.

The starting point for the identification of opportunities was in line with the top-down NAMA development approach described in Section 2: first looking at the NAMA submissions made by each country to the UNFCCC under the Copenhagen Accord/Cancun Agreements, the national communications, and overarching national climate policy priorities and strategies that could fit the NAMA framework. The top-down screening was complemented by a bottom-up process of looking to see if there are existing PoA proposals that could be suited to being scaled-up to a NAMA (based on the PoAs identified during the preparation of the CDM report – in particular, where the assessment of probability of registration prior to the end of 2012 was low).

Opportunities were discussed with stakeholders during the field trips undertaken by ALCOR during the country studies. Stakeholders were also given the opportunity to comment on the NAMA opportunities identified. While every effort was made to incorporate the useful comments received, it was not always possible to fully develop all suggestions.
Table 4 provides a high level summary of the top down and bottom up screening process.

Table 4 Overview of top down and bottom screening of countries

<table>
<thead>
<tr>
<th>Country</th>
<th>NAMA submissions*</th>
<th>National Communications</th>
<th>National policy</th>
<th>PoAs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sectors</td>
<td>Types of NAMAs</td>
<td>Latest communication</td>
<td>Is there a national climate policy in place?</td>
</tr>
<tr>
<td>ALGERIA</td>
<td>Energy</td>
<td>Mentions past actions and general policies</td>
<td>2nd (2010)</td>
<td>RE and EE strategy</td>
</tr>
<tr>
<td>JORDAN</td>
<td>Transport, energy, waste, agriculture and forestry</td>
<td>Studies, specific policies, specific projects, best management practices</td>
<td>2nd (2009)</td>
<td>RE and EE strategy but no climate policy</td>
</tr>
<tr>
<td>LEBANON</td>
<td>*Has not made a NAMA submission</td>
<td>2nd (2011)</td>
<td>National Strategy for the electricity sector (2010); National Energy Efficiency Action Plan</td>
<td>No</td>
</tr>
<tr>
<td>LIBYA</td>
<td>*Has not made a NAMA submission</td>
<td>None</td>
<td>RE and EE plans but no climate policy</td>
<td>No</td>
</tr>
<tr>
<td>SYRIA</td>
<td>Has not made a NAMA submission</td>
<td>Initial (2010)</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>YEMEN</td>
<td>Has not made a NAMA submission</td>
<td>Initial (2001)</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

Brief descriptions of the identified NAMA opportunities are presented below for each of the RCREEE states. Initial suggestions are made regarding areas where financial or technical support from industrialised countries could be provided to help implement the NAMA. Some options could be further explored for partial financing through crediting as indicated. These are to be treated as preliminary suggestions only. In some cases we have adapted the initial ideas discussed with stakeholders and put forward by ALCOR by combining different actions under a single NAMA concept. We indicate below where this has been done.

**Algeria**

1. Development of CSP plants for domestic supply and export

NAMA is driven by Renewable Energy and Energy Efficiency Programme 2011

- Two pilot plants with total capacity of about 150 MW each, in 2011-2013 period
- Four solar thermal plants with a total capacity of about 1 200 MW in the period 2016-2020
- Installation of an annual capacity of 500 MW until 2023, then 600 MW per year until 2030

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5 See FCCC/AWGLCA/2011/INF.1
Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

NAMA scope/boundary: national electricity generation sector

Type of support required: supported NAMA with possibility for crediting
- Financial - external funding for design and optimization in plant
- Technical - assistance in the design and optimization of CSP plants, assistance for MRV system establishment

2. Residential buildings energy efficiency NAMA

The idea is a comprehensive NAMA for the residential building sector which incorporates elements of the national energy strategy and is directly linked to the national energy conservation programmes in the building sector. The NAMA would utilise low cost measures utilising mature technologies.
- CFL distribution – initial pilot of 5 million CFLs, ramping up in line with the strategy of phasing out incandescent lamps by 2020. Estimated market potential of 30 million CFLs
- Insulation programme – short-term objective to insulate 2,000 buildings by 2014 and ramp up beyond this timeframe
- Solar hot water (SHW) heaters - government subsidy to address cost differential between SHW and subsidised butane - target is nearly 500,000m² of installed capacity by 2020 (GEF, 2008)

NAMA scope/boundary: national residential buildings sector

Type of support required: supported NAMA, possible credited NAMA elements
- Financial - investment support for initial purchase of equipment, credit creation can help finance ramping up of programmes
- Technical - assistance for MRV system establishment, accreditation and training programmes (installers), regulatory reforms etc

Note: this NAMA idea combines elements put forward by ALCOR (CFL distribution, insulation) with new elements (SHW programme). We believe that a comprehensive NAMA can provide some benefits, for example reducing MRV costs by being able to measure emissions reductions on a whole of building basis rather than setting up a framework for each individual component. There are also likely to be technical and capacity building synergies in developing a comprehensive NAMA.

Egypt

3. Renewable energy investment NAMA

NAMA designed to deliver the Egyptian Government’s target of 20% renewable energy in the mix by 2020, based on three measures already being developed/considered by the Government:
- Introduction of a system of feed-in tariffs for a wide range of technologies (wind, solar PV, solar thermal, biomass, small-scale hydropower)
- Establishment of a RE support fund to back feed-in tariff payments – critical for encouraging private sector (IPP) investment due to the debt challenges faced by the national utility, EHCC (AfDB, 2010)
- Regulatory reform designed to increase the participation of Independent Power Producers (IPPs) in the market

NAMA scope/boundary: national electricity supply sector

Type of support required: supported NAMA, credited NAMA
- Financial – international donor contributions to kick-start RE support fund, involving grants, loans and/or payment guarantees to support Egyptian Government in backing feed in tariffs

Note: this NAMA is not based on the country case study conducted by ALCOR.

World Bank CTF seed funding of USD50 million expected for the establishment of fund (AfDB, 2010)
• Technical – support for development of grid code, regulatory development to implement feed-in tariff system, fund set-up, establishment of MRV framework.

Jordan

4. Wind and solar energy development programme

NAMA is based on the national energy strategy
• aims at covering 10% of primary energy needs of the country by 2020 by using renewable energies (wind and solar, primarily CSP and PV)
• installing 600 MW by 2020 and 1200 MW by 2030
• projects unlikely to benefit from CDM, as they will be installed after 2012, but could form a NAMA

NAMA scope/boundary: national electricity supply sector

Type of support required: supported NAMA, credited NAMA
• Financial - investment subsidy and soft loans for kick-starting programme; crediting a possibility for financing marginal investments
• Technical - assistance to NEPCO and Ministry of Electricity with capacity building on the management of wind energy and its integration in the electricity system, wind forecasting etc

5. Demand-Side Energy Efficiency Programme for Water Pumping Stations

NAMA aims to transform a proposed PoA developed by the Ministry of Water in cooperation with GIZ (see CDM report) into a NAMA, considering that it will be difficult to register it before 2012
• Improvement in energy efficiency at water pumping stations through various measures
• Potential for emissions reductions of 64 ktCO2e per year
• Implementation: 2013-2016; operation : 2013-2030

NAMA scope/boundary: national water sector

Type of support required: supported NAMA, credited NAMA
• Financial – support for domestic capacity building of the staff of Water Authority on various aspects related to energy efficiency in pumping systems; crediting could finance energy efficiency investments
• Technical - support to Water Authority for development of MRV procedures

6. City Wide mitigation programme of Greater Amman Municipality

This involves the conversion of a PoA being developed by the Greater Municipality of Amman (with the help of the World Bank to a NAMA. The PoA is seen as highly unlikely to register before 2012 (see CDM report).
• Covers emission reduction opportunities in municipal waste, urban transport, sustainable energy, and urban forestry estimated to average around 560 ktCO2e per year
• Investment subsidies, capacity building of municipality staff etc
• Implementation in 2013-2016; operation : 2013-2030

NAMA scope/boundary: Energy, transport, municipal waste, urban forestry/ Greater Amman Municipality

Type of support required: supported NAMA, credited NAMA
• Financial – financing of investment subsidy and soft loans
• Technical – capacity building support to Greater Amman Municipality, Assistance to the development and the implementation of the MRV system related to the proposed NAMA
Lebanon

7. Comprehensive NAMA to reduce electricity sector emissions intensity

The idea of the NAMA would be to cover the existing objectives set out in Government strategy for the electricity sector, and to mobilise financial resources to help reduce the emission factor of the electricity produced in Lebanon by 40%. Measures would include:

- Opening the electrical market to private sector by implementing new regulations
- Rehabilitating existing hydro installations
- Promoting electricity generation from renewable energy (hydro, wind, solar, geothermal, etc.), through feed-in tariffs, and specific financial mechanisms
- Implementing infrastructure for natural gas, as defined in the national strategy
- Implementing an ambitious programme to reduce technical losses

NAMA scope/boundary: national electricity sector

Type of support required: supported NAMA, potentially credited NAMA
- Financial: grants to support public sector investment programme; investment subsidies and soft loans to stimulate private sector involvement in market; crediting to be explored as a potential source of finance
- Technical: assistance to the Ministry of Energy and EDL with regulatory development, further definition of the NAMA, design and implementation of MRV arrangements

8. Public transport development in Lebanon

The NAMA would involve the integration of three measures into one NAMA:

- revitalization of the Public Transport System in greater Beirut, through improvement (qualitative and quantitative) of the public bus fleet and the implementation of dedicated lanes for buses. The objective of the NAMA would be to reach a 50% distribution of passenger-trips travelled by public transportation (measure is contained in the second national communication)
- development of a rail network linking the northern border with the cities of Tripoli and the Port of Beirut (based on a proposal being developed by the Ministry of Public Works and Transportation)
- a car-scrapping programme, involving maximum of 40,000 old vehicles (measure contained in second national communication).

NAMA scope/boundary: transport/Greater Beirut Municipality/whole of Lebanon

Type of support required: supported NAMA
- Financial: grants and soft loans to meet the Investment costs requirements
- Technical: assistance to the Ministry of Public Works and Transportation and the Municipality staff of Beirut on sustainable transportation modes, defining the NAMA and the design and implementation of the MRV system

Libya

9. Energy efficiency in residential building sector

The idea is to propose a NAMA that targets the residential building sector and aim at reducing by half the current average specific emission in this sector. The NAMA would entail a set of measures including:

- Building thermal code for new constructions
- Labelling and minimum energy efficiency standards of electrical appliances
- Solar water heater market development with the objective to install at least 250,000 m² by 2023
- Widespread distribution of CFLs

NAMA scope/boundary: residential building sector/national
Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

Type of support required: supported NAMA
- Financial: Soft loans, grants
- Technical: Comprehensive assistance to GECOL, ROAL and the Ministry of Electricity in development of building codes, labelling scheme, capacity building and training of installers and development and implementation of the MRV system

Morocco

10. Residential buildings energy efficiency NAMA

The idea is to develop a NAMA for the residential building sector which incorporates a range of actions:
- the Government’s ambitious strategy aimed at reaching an installed capacity of approximately 1.7 million square meters of SHW in 2020 and 3 million square meters by 2030 (REN21, 2010). This will be driven by a financial mechanism to help customers overcome economic barriers
- acceleration of a CFL distribution programme that is currently experiencing delays (programme being implemented by the national utility, ONE
- measures related to the thermal performance of buildings (building codes, insulation programme)
- potentially other measures such as energy efficiency labelling of appliances, and incorporation of a programme to encourage energy savings through discounts on energy bills (20-20 initiative)
- capacity building of the market operators: suppliers, installers; communication and awareness raising.

NAMA scope/boundary: residential buildings/national

Type of support required: supported NAMA, credited NAMA
- Financial – provision of soft credit lines to local banks to extend concessional finance to customers
- Technical – technical and capacity building support to assist ADEREE with design and implementation

Note: this NAMA idea combines elements put forward by ALCOR (SHW market development) with new elements (CFL acceleration, insulation programme etc). We believe that such a comprehensive NAMA can provide considerable benefits, for example reducing MRV costs by being able to measure emissions reductions on a whole of building basis rather than setting up a framework for each individual component. There are also likely to be technical and capacity building synergies in developing a comprehensive NAMA.

11. Demand-Side Energy Efficiency Programme in the industrial sector

The Government of Morocco with the support of the GEF/AfDB is seeking to set up a programme to enable investment in energy efficiency in the manufacturing sector.
- Five components:
  - Institutional and regulatory framework to support EE law;
  - Demonstration of pilot EE projects;
  - Subsidies of energy audits and EE investment feasibilities;
  - Training and accreditation of certified energy managers;
  - Information dissemination, communication and EE promotion
- To be implemented over 2012-16, and aims to achieve a cumulated reduction of over 2 Mtoe in energy consumption and GHG reduction of 8 MtCO₂e over the 10 year horizon stretching to 2020

NAMA scope/boundary: energy efficiency (industry)/national

Type of support required: supported NAMA, credited NAMA
- Financial – credits (estimated at 800 ktCO₂e pa) would finance investment in efficiency improvements
- Technical – support for ADEREE in developing MRV framework and capacity building components
**Syria**

### 12. Promotion of Solar Water Heating Systems

NAMA would involve a full package of measures to drive the uptake of SHW systems nationally – estimated to be able to reach a total number of houses of 7.9 million in 2030

- requires the establishment of a legal and institutional framework
- financial assistance for end users to support purchase of SHW systems
- implementation of compulsory minimum efficiency standards for SHW systems

**NAMA scope/boundary:** residential buildings, national

**Type of support required:** supported NAMA

- Financial - short-term and long-term funding to support the programme
- Technical – technical assistance with standards

### 13. Energy efficiency building code

NAMA idea is based on a proposal for GEF funding submitted by UNDP in December 2010

- development of an energy efficiency building code for the construction of new buildings
- requires strengthening of the local institutional framework to ensure sustainability of results – e.g.
- requires an enforcement regime and capacity building of local agencies

**NAMA scope/boundary:** residential buildings, national

**Type of support required:** supported NAMA

- Financial - short-term and long-term funding to support the programme
- Technical – technical and institutional capacity building, assistance to National Energy Research Centre/Ministry of Electricity in the building code design

**Tunisia**

The aforementioned Tunisian NAMAs for the energy sector (Tunisian Solar Plan) and waste sector (Biowaste Treatment Plan) cover a very wide range of specific measures. In this report, we have identified two NAMA opportunities that build on specific measures which could be expanded and developed as stand-alone NAMAs.

### 14. Self-generation in the industrial and tertiary sector

NAMA idea is to support the Government’s promotion of the development of various energy sources including wind energy and cogeneration for the purposes of self-generation and export to the grid in the industrial and tertiary sectors. The concept is to combine the installation of 120 MW of wind capacity in the industrial sector (identified by ALCOR in its country study) with the installation of 340 MW of cogeneration by 2016 in the industrial and tertiary sectors under a single NAMA. If the CDM cogeneration development PoA (see CDM report) is not able to be registered by the end of 2012 this could be rolled into the NAMA.

- Premium price paid for industrials supplying electricity to the state-owned utility, STEG, offered to 2031
- Regulatory reform to enable self-producers to sell to other private entities and removal of a 30% limit on the supply of electricity to STEG

**NAMA scope/boundary:** electricity supply/industrial/tertiary sector/national

**Type of support required:** supported NAMA, credited NAMA

- Financial – support in financing of subsidy mechanism (possible through grants/loans as a supported NAMA and/or through crediting)
- Technical - assistance to ANME and STEG for implementation of MRV framework (especially for cogeneration components).
15. Building sector roofing insulation

This NAMA is based on the National Agency for Energy Conservation’s (ANME) pilot programme, Promo-Isol, which provides a 20% subsidy on the costs of installing roofing insulation and loan support for remaining capital costs. The idea is that the subsidy to encourage the uptake of insulation can be financed through the reduction of subsidies for energy used in heating and cooling at present. Thus, the emissions reductions achieved would be covered under the unilateral NAMA component.

- NAMA is based on an existing PoA idea, which is more suited to a NAMA due to low prospects for registration due to problems with the chosen methodology and additionality risks.
- Target of 60,000 buildings insulated by 2015 and 270,000 buildings by 2020, programme to end 2030
- By 2020 over 34 million m² of roofing insulation will have been installed

NAMA scope/boundary: self-constructed private residential buildings, national

Type of support required: supported NAMA

- Technical: Assistance to ANME for MRV system establishment, accreditation/quality control of installation providers
- Financial: assistance with programme establishment; support for concessional loans to be explored further

Yemen

While as an LDC Yemen has the possibility to pursue CDM projects beyond 2012, the NAMA framework could also provide other means of support such as direct finance, capacity building and technical assistance.

16. Energy Efficiency Labelling of Electronic Household Appliances

NAMA would involve establishment of an energy labeling scheme for electronic household appliances such as washing machines, dishwashers, ovens, air-conditioning systems.

- Increase consumer’s awareness on the real energy use of household appliances through a liable and clear labelling in their sales points
- Complementary system of Minimum Efficiency Performance Standards (MEPS) to prevent dumping of highly inefficient household appliances

NAMA scope/boundary: residential energy efficiency/national

Type of support required: supported NAMA

- Financial – programme establishment including purchase of testing equipment, training etc, plus long-term support to ensure sustainability of programme
- Technical - support for the design and implementation of energy labelling model

17. Efficient lighting in public buildings

NAMA involves promotion of the adoption of CFLs in government buildings in Yemen.

- Establishment of a legal and institutional framework to facilitate implementation of the programme
- Acquisition of high-quality CFLs – estimated potential of 300,000 lamps in the public sector
- Capacity building and raising awareness activities

NAMA scope/boundary: public buildings sector/national

Type of support required: supported NAMA

- Financial – funding for awareness raising activities, training courses, purchase of CFLs
- Technical – assistance with entire programme set up and implementation
Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

Table 5: Summary of NAMA opportunities in the RCREEE member countries

<table>
<thead>
<tr>
<th>Countries</th>
<th>NAMA opportunity</th>
<th>Type of NAMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALGERIA</td>
<td>▪ Development of CSP plants for domestic supply and export</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td></td>
<td>▪ Residential buildings energy efficiency NAMA</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td>EGYPT</td>
<td>▪ Renewable energy investment NAMA</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Supported NAMA with crediting possibility to be explored and/or conceptualisation as a sectoral crediting mechanism</td>
</tr>
<tr>
<td>JORDAN</td>
<td>▪ Wind and solar energy development programme</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td></td>
<td>▪ Demand-Side Energy Efficiency Programme for Water Pumping Stations</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td></td>
<td>▪ City Wide mitigation programme of Greater Amman Municipality</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td>LEBANON</td>
<td>▪ Comprehensive NAMA for grid emissions intensity reduction</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td></td>
<td>▪ Public transport development</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td>LIBYA</td>
<td>▪ Energy efficiency in residential building sector</td>
<td>▪ Supported NAMA</td>
</tr>
<tr>
<td>MOROCCO</td>
<td>▪ Residential buildings energy efficiency NAMA</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td></td>
<td>▪ Demand-Side Energy Efficiency Programme in the industrial sector</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td>SYRIA</td>
<td>▪ Promotion of Solar Water Heating Systems</td>
<td>▪ Supported NAMA</td>
</tr>
<tr>
<td></td>
<td>▪ Energy efficiency building code</td>
<td>▪ Supported NAMA</td>
</tr>
<tr>
<td>TUNISIA</td>
<td>▪ Self-generation in the industrial/tertiary sectors</td>
<td>▪ Supported NAMA with crediting possibility to be explored</td>
</tr>
<tr>
<td></td>
<td>▪ Building sector roofing insulation</td>
<td>▪ Unilateral NAMA with technical/capacity building support</td>
</tr>
<tr>
<td>YEMEN</td>
<td>▪ Energy Efficiency Labelling of Electronic Household Appliances</td>
<td>▪ Supported NAMA</td>
</tr>
<tr>
<td></td>
<td>▪ Efficient lighting in public buildings</td>
<td>▪ Supported NAMA</td>
</tr>
</tbody>
</table>
4. Strategic considerations for RCREEE member states in engaging on sectoral crediting

Background

Art.11.a (5) of the EU ETS Directive (2009/29/EC) contains the legal basis for the Community to conclude agreements with third countries for the provision of sectoral credits in the event that the negotiations on an international agreement on climate change are not concluded by 31 December 2009. The Article states that “credits from projects or other emission reducing activities may be used in the Community scheme in accordance with agreements concluded with third countries, specifying levels of use.” It should also be noted that if there is an international agreement, only credits from projects in third countries that have ratified the agreement will be eligible for use in the EU ETS, and the types of credits agreed on will be subject to a common EU approach.

The entitlement only applies “to the extent that the levels of CER and ERU use, allowed to operators or aircraft operators by Member States for the period from 2008 to 2012, have not been used up”. Depending on the extent of restrictions on offset categories in Phase III, the extent of the carry-over of import quotas from Phase III and whether the EU moves to a 30% reduction target, demand for credits from bilateral arrangements may be limited. On the supply side, the Commission’s assessment is that there is no shortage of supply from CDM projects already registered and in the pipeline to accommodate the maximum possible EU demand for international credits (European Commission, 2011c).

However, the opportunity for bilateral arrangements on sectoral crediting should not be seen purely in the limited context of the existing market. In its recent clarifications, the Commission also stated that it “envisages the primary focus of potential bilateral agreements to be on creating demand for credits from new market mechanisms and to pilot the establishment of such new market mechanisms.” (EC, 2011c). That is, the opportunity for piloting NAMA crediting and sectoral crediting arrangements is seen as a way of paving the way for more ambitious emissions reduction obligations, thus increasing demand for credits in the longer term.

Bilateral arrangements involving sectoral crediting and potentially other measures such as CDM discounting could pave the way for an increase in the EU’s target - even in the absence of global cap and trade system (European Commission, 2010). The Commission has previously identified a number of arguments for engaging in bilateral negotiations on sectoral mechanisms as part of its consideration of a move to a 30% target (European Commission, 2010):

- Sectoral mechanisms would leverage greater global reductions on the back of EU emissions reduction efforts compared with the CDM (page 8)
- This would also leave greater room for the CDM for LDCs (page 8)
- Sectoral mechanisms present a means of addressing carbon leakage from emissions-intensive EU industries such as steel and aluminium. The uncredited emissions reductions required to meet the crediting threshold represent a cost to developing countries, whereas CERs are a subsidy for all reductions below BAU (page 13).

The European Commission intends to focus on the sectoral crediting model (no-lose target) to help eliminate technical and political barriers to making progress in UNFCCC on the introduction of new mechanisms (Bernheim, 2011). As a possible pilot, the Commission has examined the potential to initiate sectoral crediting for nitrous oxide reductions in developing countries, with a view to making a proposal for sectoral crediting in these areas (EC, 2011a).

Pros and cons for RCREEE member states to engage in bilateral negotiations with the EU on sectoral mechanisms

The baseline “do nothing” option is for the RCREEE member countries to focus purely on the existing carbon market mechanism – i.e. the CDM – and to wait and see what happens with the new market based mechanisms being discussed in the context of an international climate agreement. In considering the pros and cons of departing from this path and engaging in negotiations on sectoral crediting with the EU, a key consideration is whether the member countries will be able to attract carbon market opportunities and capacity building support elsewhere if they decided not to engage with the EU. Any other options available to
RCREEE member states should therefore also be assessed against the possible pros and cons of engaging with the EU.

Alternative options for RCREEE member countries could include:

- Selling credits into other schemes such as the Japanese bilateral offset mechanism, the recently legislated but yet to commence Australian ETS, or potentially the Californian cap and trade scheme known as “AB32”
- Selling credits into carbon fund facilities established by multilateral development banks such as the World Bank, which may also offer capacity building support.

A range of issues are considered below for each of these options and the results of the assessment of the various options against each of the pros and cons is presented in Table 6.

**Pros:**

**First mover advantage in bringing abatement to market** – countries which start negotiating with the EU on difficult issues such as the level of ambition of baselines, defining sectoral coverage, MRV rules etc may gain experience ahead of other potential suppliers of credits. Implementing sectoral crediting will take several years, so getting started early is important to gain access to the limited market. Experience with CDM demonstrated that early movers were able to gain an advantage in the market.

**First mover advantage in gaining access to NAMA pilot funding** – the EU may be limited in how much capacity building support and NAMA pilot funding it is willing to offer middle income countries without engagement on sectoral mechanisms. There will be limited capacity internationally to pay for sectoral pilots. Latecomers could be left to fund capacity building efforts, implementation of MRV systems etc themselves. While multilaterals may offer some funding, via the PMR for example, which Morocco and Jordan have joined, it is not yet clear how much funding will be available internationally for market-readiness capacity building.

An exception is the case of Yemen, which as an LDC should in principle be eligible to attract NAMA support regardless of its engagement on sectoral mechanisms.

**Potential for demonstrating workability of sectoral approaches.** Even if an agreement on establishing new market mechanisms is reached at Durban, there will be many details still to be worked through. Lessons gained from pilot projects will be able feed into the operationalized future mechanism, as was the case with the CDM following the early experience with Activities Implemented Jointly (AIJ).

**Cons:**

**Negative impact on CDM investment** – signalling to the market that the country wants to engage on the implementation of a sectoral crediting mechanism could be a concern if this impacts negatively on the CDM market at such an uncertain time. However, given the limited timeframe for pursuing CDM opportunities to monetize in the EU ETS, this will soon be less of a concern. Further, there are ways of dealing with any double counting issues.

**Negative impact on direct NAMA funding** – one could argue that countries may be better off focusing on obtaining direct finance via supported NAMAs as the preferred means for monetizing abatement. However, as discussed above, the EU is more likely to provide funding to those middle income countries that are likely to engage on sectoral mechanisms.

**Undermines multilateral process** - bilateral negotiations could be seen by others to undermine the multilateral process or “breaking ranks” with other developing countries opposed to sectoral mechanisms. On the other hand, bilateral agreements have the potential to feed into an international agreement.

**Limited flexibility in pursuing certain technologies** – the EU’s restrictions on certain technology types may be seen as a disadvantage, and should be considered against the opportunities offered by alternatives.

---

8 The Californian Air Resources Board Emissions Trading Program (commonly known as AB 32) does not allow use of international offsets in the near term, but includes a framework for future inclusion of international offset programs.
### Table 6: Pros and cons of various post 2012 carbon market options

<table>
<thead>
<tr>
<th></th>
<th>EU bilateral sectoral arrangements</th>
<th>Other bilateral arrangements – eg. Japan, Australia, California</th>
<th>Multilateral sources – eg. World Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First mover advantage in gaining access to carbon markets</td>
<td>✓</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can accommodate sector-based credits post 2012 due to clear rules in ETS Directive</td>
<td>Uncertain how much of the planned Japanese GHG reduction will be domestic versus through bilateral offsets</td>
<td>No dedicated multilateral carbon fund to buy post 2012 credits at present, although this is under discussion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Australian scheme’s rules relating to import of credits post 2015 are not yet fully specified&lt;sup&gt;9&lt;/sup&gt;</td>
<td>The role of carbon markets in relation to long term climate finance and the Green Climate Fund is still under discussion.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Californian scheme does not currently include international offsets. In future, it may allow for this, but could also include supply from (low cost) REDD credits</td>
<td></td>
</tr>
<tr>
<td>First mover advantage in gaining access to capacity building, NAMA funding</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Likely to leverage (limited) capacity building, NAMA support available from EU for middle income countries for pilot projects, MRV assistance etc</td>
<td>Japan is offering technology transfer, help with MRV arrangements etc; risk that the standards implemented may not be compatible with international standards</td>
<td>Some money is available (eg. World Bank PMR), but unclear how much will reach developing countries on the ground</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other schemes – no details at present if capacity building support will be offered</td>
<td></td>
</tr>
<tr>
<td>Potential for feeding into a post 2012 global climate policy framework</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>EU is committed to a global treaty with legally-binding emissions reduction targets. Sectoral approaches seen as important step.</td>
<td>Japanese preference is for a decentralized approach. Engagement with Japan may not be as conducive to a global framework. Australian preference is somewhere between EU and Japan</td>
<td>Initiatives such as PMR will provide useful inputs to global framework</td>
</tr>
</tbody>
</table>

<sup>9</sup> The Australian ETS legislation was passed by the Australian Parliament on 8 November 2011. The scheme may provide additional sources of demand for credits when it is opened up to use of international offsets from 2015. However, the details relating to specific import restrictions to be placed on eventual use of credits generated from various sources or countries, if and when they are allowed into the Australian ETS from 2015 onwards are not yet certain.
<table>
<thead>
<tr>
<th>EU bilateral sectoral arrangements</th>
<th>Other bilateral arrangements – eg. Japan, Australia, California</th>
<th>Multilateral sources – eg. World Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Negative impacts on CDM investment</strong></td>
<td>Potentially negative impact, but can be addressed by protecting CDM investments through careful design of sectoral mechanism</td>
<td>Extent of impact will depend on project types pursued (nuclear will not impact on CDM for example)</td>
</tr>
<tr>
<td><strong>Negative impacts on access to NAMA funding</strong></td>
<td>Not seen as negative. More likely to enhance access to NAMA funding for middle income countries, which may otherwise miss out</td>
<td>Countries seen to be pursuing Japanese bilateral offset market could be shunned by donors wanting to finance through the UNFCCC framework</td>
</tr>
<tr>
<td><strong>Undermines multilateral process</strong></td>
<td>On the contrary, engaging in pilots and demonstration projects can feed into multilateral process and influence future design of global treaty.</td>
<td>Likely to be seen as supporting Japanese rejection of a binding international treaty and preference for a decentralised approach.</td>
</tr>
<tr>
<td><strong>Limited flexibility in utilizing certain technologies to generate credits</strong></td>
<td>To some extent (no nuclear, large hydro, no forestry), but some flexibility may be possible – eg. Commission is considering sec mex for NO reductions</td>
<td>On the one hand would allow nuclear, CCS, however, depends on appetite for buying Japanese technologies</td>
</tr>
</tbody>
</table>

*Perspectives GmbH Hamburg Office Baumeisterstr. 2 20099 Hamburg, Germany · www.perspectives.cc · info@perspectives.cc*
Initial conclusions on whether RCREEE member states should engage with the EU

The residual demand for sector-based credits in Phase III of the EU ETS may be quite limited if there is no increase in the level of ambition of the EU’s reduction target. However, a market for credits generated by new mechanisms will in any case involve a significant ramping-up period in which the market framework is put in place in the participating countries and the emissions reduction activities are implemented under the new framework/s. This could take many years, suggesting that the near term demand outlook for credits is less relevant than the longer term outlook. Countries wishing to access carbon market finance over the longer term need to act fast to be part of this “learning by doing” phase, in which sector-based approaches will be demonstrated through pilot-scale initiatives. Since sector-based crediting and trading is the EU’s preferred approach, and is also broadly supported by Australia, New Zealand and other potential buyer countries, there are good reasons to engage in discussions on such mechanisms with the EU.

The alternatives to engaging with the EU to access the EU ETS market have their risks:

- Japanese offset scheme – may offer a market and support for capacity building, e.g. with MRV procedures, but also with strings attached – i.e. buying Japanese technology. Also likely to reflect negatively on commitment to multilateral process, may be inconsistent with other approaches.
- Australian ETS – detailed rules relating to imported credits from 2015 onwards are yet to be fully defined. As stated, Australia is broadly a supporter of the sectoral crediting/trading framework promoted by the EU in the negotiations. Australia is also a contributor to the World Bank PMR.
- Californian cap and trade scheme – does not allow use of international offsets in current scheme design. The framework for this exists in the longer term, but credits from MENA region may have to compete with lower-cost REDD credits, which could be sourced through bilateral arrangements with states in Brazil and Mexico for example.
- Relying on multilateral institutions also carries disadvantages – sometimes criticised for cumbersome, time consuming procedures. For example, a recent case study for the OECD on the effectiveness of climate finance in Morocco highlighted delays and at times negative experiences with accessing funds and technical assistance through the World Bank and the AfDB (Grant, 2011). Also, there are still uncertainties about the role of carbon markets in relation to the Green Climate Fund. Past experience shows that funds are unlikely to receive large amounts of funding for entire policies. Multilateral support for pilots and capacity building is available, but may be limited compared with the potential for pursuing funding through bilateral approaches.

Protection of existing CDM projects should be an important pre-condition for engaging in negotiations with the EU on sectoral mechanisms. Without this, the private sector will be discouraged from investing in carbon mitigation projects – regardless of whether under the CDM or other mechanisms. Existing CDM projects should continue to be credited in full, dealing with any double counting by carving out reductions from any sectoral pilots implemented. Engaging with Japan on its bilateral offset mechanism on the other hand could be seen to have a negative impact on CDM investment because the scheme is primarily motivated as an alternative to the CDM, whereas the EU’s approach is to complement the CDM. The extent to which the Japanese scheme would compete with the CDM depends on the technologies in question.

While the EU is likely to place some restrictions on the technologies that are likely to be allowed under sectoral crediting, the advantages offered by the Japanese approach are also likely to be limited to the extent that RCREEE members have an appetite for importing Japanese technologies.

Holding out for a second Kyoto Protocol commitment period appears to be an unadvisable strategy. Those industrialised countries that are clearly not going to sign (Japan, Russia, Canada) are unlikely to be won over by not engaging on sectoral mechanisms. The demonstration of sectoral mechanisms can feed into a future global climate treaty.

Overall, it appears that the alternatives to engaging with the EU raise more concerns than advantages. RCREEE members would be advised to consider their individual opportunities for piloting sectoral mechanisms with the support of the EU.
5. Possibilities for NAMA/sectoral crediting pilots for further development

To select the most promising NAMA opportunities identified in Section 3, we have applied a range of practical selection criteria. It should be noted that this is a very preliminary analysis, based only on information gathered during what can be considered to be step one in the development of a fully fleshed out NAMA concept.

The criteria chosen for the assessment are presented in Table 7 below. The results of the screening process scoring the opportunities against these criteria are then presented in Table 8.

Table 7 Selection criteria for NAMA opportunities

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG mitigation potential</td>
<td>“high” suggests emissions reductions &gt; 500ktCO2e pa</td>
</tr>
<tr>
<td>Low cost abatement</td>
<td>lower cost abatement activities are more likely to be implemented,</td>
</tr>
<tr>
<td></td>
<td>- activities with negative costs (EE) will score particularly well</td>
</tr>
<tr>
<td>Ability to MRV actions</td>
<td>“easy” is if the NAMA approach can theoretically be based on an existing CDM</td>
</tr>
<tr>
<td></td>
<td>methodology; more complex NAMAs involving many different actions will score</td>
</tr>
<tr>
<td></td>
<td>lower</td>
</tr>
<tr>
<td>Links to national climate policy</td>
<td>“strong” links are considered to exist where the country has clearly</td>
</tr>
<tr>
<td></td>
<td>articulated climate policies and the NAMA is linked to these (eg.</td>
</tr>
<tr>
<td></td>
<td>stated in its submission in response to the Copenhagen Accords),</td>
</tr>
<tr>
<td></td>
<td>as this suggests a higher chance of successful implementation</td>
</tr>
<tr>
<td>Sustainable development benefits</td>
<td>“strong” actions would reduce household fuel costs, or create local</td>
</tr>
<tr>
<td></td>
<td>manufacturing opportunities for example, as these can improve</td>
</tr>
<tr>
<td></td>
<td>the livelihood of citizens and would be more appealing to donors</td>
</tr>
</tbody>
</table>

Where further information is required the field is marked with the question mark symbol (?).
### Table 8: Screening of identified NAMA opportunities for further development

<table>
<thead>
<tr>
<th>Country</th>
<th>NAMA opportunity</th>
<th>GHG mitigation potential</th>
<th>Cost – effectiveness of abatement</th>
<th>MRV of actions</th>
<th>Linked to national climate policies</th>
<th>Sustainable development benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>JORDAN</td>
<td>Wind and solar energy development programme</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Demand-Side Energy Efficiency for Water Pumping Stations</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>City Wide mitigation programme of Greater Amman Municipality</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>YEMEN</td>
<td>Energy Efficiency Labelling of Electronic Household Appliances</td>
<td>?</td>
<td>+++</td>
<td>++</td>
<td>??</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Efficient lighting in public buildings</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>SYRIA</td>
<td>Promotion of Solar Water Heating Systems</td>
<td>?</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Energy efficiency building code</td>
<td>?</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>LEBANON</td>
<td>Comprehensive NAMA to reduce electricity grid intensity</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Public transport development</td>
<td>+</td>
<td>+?</td>
<td>??</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>LIBYA</td>
<td>Energy efficiency in residential building sector</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>?</td>
<td>+++</td>
</tr>
<tr>
<td>ALGERIA</td>
<td>Development of CSP plants for domestic supply and export</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Residential buildings energy efficiency NAMA</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>EGYPT</td>
<td>Renewable energy investment NAMA</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>TUNISIA</td>
<td>Self-generation in the industrial and tertiary sectors</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Building sector roofing insulation</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>MOROCCO</td>
<td>Residential buildings Energy Efficiency NAMA</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Demand-Side Energy Efficiency Programme in the industrial sector</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>+</td>
</tr>
</tbody>
</table>
The above screening shows that there are many potential NAMA opportunities which have scored quite highly. To establish a shortlist of the top three opportunities, we therefore also considered two more practical factors – firstly, the level of country risk associated with the political and security situation; and secondly, the likelihood for a successful implementation based on evidence of political commitment.

On the country risk basis, we do not prioritise further development of the identified opportunities in Syria, Yemen and Libya at this stage. Once the political and security situation in those countries is clearer, it would be possible to reassess and further develop such opportunities. In addition, these countries have not made NAMA submissions to date and would therefore need to demonstrate a political commitment to the NAMA framework prior to further development of NAMA opportunities. Similarly, of the two opportunities for a residential energy efficiency building sector NAMA identified in 1 and in Morocco, the higher level of political commitment to climate policy in the latter suggests a higher likelihood of implementation. This is evidenced by firstly, the much more specific mitigation measures presented by Morocco in its NAMA submission to the UNFCCC; and secondly, the Moroccan Government’s relatively more comprehensive climate change mitigation plan, “National Plan Against Global Warming” (released in 2009).

The shortlisted top three NAMA opportunities for possible further development are thus described below.

**Option 1-Tunisian improvement of building insulation NAMA**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Building Sector, energy efficiency</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>Brief description</td>
<td>NAMA involves conversion of an existing PoA idea which is unlikely to be additional or registered prior to 2013 (see CDM report). The “PROMO-ISOL” pilot programme involves insulating roofs of private houses (new and existing buildings) not covered by thermal building regulations. The NAMA would expand on this programme and would aim to insulate 60,000 buildings by 2015 and 270,000 by 2020. The objective is to reduce the demand of fossil fuel for heating and fossil fuel based power generation for cooling in such premises. By reducing the demand for fossil fuels for heating and electricity for cooling, this will reduce government subsidies for fossil fuels, which will help pay for the programme. Financial support will be offered to owners of house owners who undertake the investment.</td>
</tr>
</tbody>
</table>
| Measures and activities with direct impact on GHG emission reduction | • Provision of a subsidy of 15-20% of upfront costs, provided per m² of insulated roof  
• Offering lower interest rate loans through local banks to cover remaining costs |
| Measures and activities with indirect impact on GHG emission reduction | • Capacity building of operators, quality control  
• Equipment of local authorities with relevant facilities for insulation material accreditation  
• Assistance to ANME for development and implementation of MRV |
| NAMA timeframe            | Implementation: 2012-2014  
Operation: 2012-2030 |
| Estimated emissions reductions | Total estimated emission reductions of 2.5 MtCO2e until 2030  
(assumes insulation activities end in 2020) |
| MRV approach              | Will require development of a new MRV system since existing PoA design is not suitable. Technical support would be provided by interested donor countries. |
| NAMA type                 | Unilateral NAMA: emissions reductions achieved  
Supported NAMA: technical assistance to ANME for establishment of MRV system, training operators etc |
Option 2 - Moroccan residential buildings energy efficiency NAMA

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Residential building Sector, energy efficiency</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>Brief description</td>
<td>The concept is a NAMA for the residential building sector which incorporates several measures including subsidies for the uptake of SWH systems (currently being developed by ADEREE), acceleration of a CFL distribution programme that is experiencing delays, and measures related to the thermal performance of buildings (building codes, insulation programme). Also to be explored is the energy efficiency labelling of major household appliances such as refrigerators and air-conditioners.</td>
</tr>
<tr>
<td>Measures and activities with</td>
<td>• Solar water heater (SWH) heater market development via subsidy and loans programme</td>
</tr>
<tr>
<td>direct impact on GHG emission</td>
<td>• Acceleration of CFL distribution – additional 8m CFLs need to be distributed to meet target of 23m by 2014</td>
</tr>
<tr>
<td>reduction</td>
<td>• Insulation programme – to be further defined</td>
</tr>
<tr>
<td>Measures and activities with</td>
<td>• Energy-labelling of domestic</td>
</tr>
<tr>
<td>indirect impact on GHG</td>
<td>• Implementation and enforcement of residential building codes</td>
</tr>
<tr>
<td>emission reduction</td>
<td>• Training, accreditation and capacity building of local installers</td>
</tr>
<tr>
<td></td>
<td>• Promotional activities, consumer awareness etc</td>
</tr>
<tr>
<td>NAMA timeframe</td>
<td>Implementation: 2012-2014</td>
</tr>
<tr>
<td></td>
<td>Operation: 2012-2030</td>
</tr>
<tr>
<td>Estimated emissions reductions</td>
<td>• SWH market development: 270 ktCO₂e per year</td>
</tr>
<tr>
<td></td>
<td>• Acceleration of CFL distribution: 170 ktCO₂/year</td>
</tr>
<tr>
<td></td>
<td>• Building codes, insulation: to be estimated</td>
</tr>
<tr>
<td></td>
<td>• Energy labelling: 780 ktCO₂/year (UNFCCC, 2011b)</td>
</tr>
<tr>
<td>MRV approach</td>
<td>To be developed with support for ADEREE. Options include using CDM whole-building methodology “Energy efficiency technologies and fuel switching in new buildings” (AM0091), or small scale methodologies for individual actions (such as AMS-II.C, AMS III-AE)</td>
</tr>
<tr>
<td>NAMA type</td>
<td><strong>Unilateral NAMA</strong>: provision of subsidies for SWH systems; introduction of building code, possibly the insulation programme**. <strong>Supported NAMA</strong>: provision of concessional loans to help finance SWH roll-out, technical assistance to ADEREE to develop MRV framework, an energy labelling scheme, and the building code; training and accreditation of insulation and SWH installers. <strong>Credited NAMA</strong>: most likely suited to acceleration of CFL programme, given low domestic energy costs (suggests that CFLs could be additional in a crediting programme)</td>
</tr>
</tbody>
</table>

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*Option 2 - Moroccan residential buildings energy efficiency NAMA*

**Item** | **Description**
--- | ---
Sector | Residential building Sector, energy efficiency
NAMA boundary | Entire country
Brief description | The concept is a NAMA for the residential building sector which incorporates several measures including subsidies for the uptake of SWH systems (currently being developed by ADEREE), acceleration of a CFL distribution programme that is experiencing delays, and measures related to the thermal performance of buildings (building codes, insulation programme). Also to be explored is the energy efficiency labelling of major household appliances such as refrigerators and air-conditioners.

Measures and activities with direct impact on GHG emission reduction:
- Solar water heater (SWH) heater market development via subsidy and loans programme
- Acceleration of CFL distribution – additional 8m CFLs need to be distributed to meet target of 23m by 2014
- Insulation programme – to be further defined

Measures and activities with indirect impact on GHG emission reduction:
- Energy-labelling of domestic
- Implementation and enforcement of residential building codes
- Training, accreditation and capacity building of local installers
- Promotional activities, consumer awareness etc

NAMA timeframe
- Implementation: 2012-2014
- Operation: 2012-2030

Estimated emissions reductions:
- SWH market development: 270 ktCO₂e per year
- Acceleration of CFL distribution: 170 ktCO₂/year
- Building codes, insulation: to be estimated
- Energy labelling: 780 ktCO₂/year (UNFCCC, 2011b)

MRV approach
- To be developed with support for ADEREE. Options include using CDM whole-building methodology “Energy efficiency technologies and fuel switching in new buildings” (AM0091), or small scale methodologies for individual actions (such as AMS-II.C, AMS III-AE)

NAMA type
- **Unilateral NAMA**: provision of subsidies for SWH systems; introduction of building code, possibly the insulation programme
- **Supported NAMA**: provision of concessional loans to help finance SWH roll-out, technical assistance to ADEREE to develop MRV framework, an energy labelling scheme, and the building code; training and accreditation of insulation and SWH installers
- **Credited NAMA**: most likely suited to acceleration of CFL programme, given low domestic energy costs (suggests that CFLs could be additional in a crediting programme)
Option 3 - Egyptian renewable energy investment NAMA

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Electricity generation sector</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
</tbody>
</table>
| Brief description             | The NAMA will help reach the goal of 20% of demand being met from renewable energy sources by 2020. The NAMA builds on existing government policy developments and aims to leverage funding being provided for the wind development programme through the World Bank’s Clean Technology Fund, the EIB and other bilateral financial institutions such as KfW. The NAMA will involve:  
- Introduction of a system of feed-in tariffs for a wide range of technologies (wind, solar PV, solar thermal, biomass, small-scale hydropower) to replace the current capacity tendering scheme  
- Establishment of a RE Development Fund to help finance feed-in tariff payments – critical for encouraging private sector IPP investment due to the present debt challenges faced by the national utility, EHCC  
- The potential for including other measures such as fuel switching, plant efficiency upgrades etc under a sector-wide NAMA could also be explored.  

| Measures and activities with direct impact on GHG emission reduction | Premium tariffs to encourage more rapid penetration of RE sources, in particular through private sector investment |
| Measures and activities with indirect impact on GHG emission reduction | Reform of the regulatory framework to enable large scale renewable energy penetration via preferential dispatch, guaranteed network access  
- Supporting the New and Renewable Energy Agency (NREA), supporting the TSO with the integration of renewables into the grid, development of an MRV system and establishment of the RE support fund |
| Estimated GHG reductions     | Based on the 2nd National Communication (Scenario 2), 7200MW of wind and 5000MW of other zero-emissions generation would result in savings of 113MtCO₂e pa in 2026/27 |
| MRV approach                  | Relatively straightforward for grid-connected renewable investments - can be based on approach in CDM methodology ACM002. Other methodologies could help inform efficiency improvements in power generation, fuel switching from single cycle to combined cycle plants etc if covered under the NAMA. |

NAMA timeframe:  
Implementation in 2011-14  
Operation in 2015-35 (to ensure 15 years investment certainty)  

NAMA implementation and operation costs:  
To be estimated  

NAMA type:  
**Unilateral NAMA**: in the medium-long term, the RE fund is designed to be self-financing through avoided domestic consumption of natural gas (for export as LNG at a higher value)  
**Supported NAMA**: financial contributions (loans, grants and/or payment guarantees) to back feed-in tariff payments; provision of technical assistance  
**Credited NAMA**: the achievement of part of the 20% target (higher cost technologies) could be credited under a sectoral crediting mechanism – to be explored further (see below)
### Institutional requirements

The further development and eventual implementation of the potential NAMA ideas described in this report would require coordination between a number of domestic and international institutions. An overview of the key institutional actors likely to be involved in development and implementation is provided below.

**Table 5 Institutional overview**

<table>
<thead>
<tr>
<th>NAMA idea</th>
<th>Key institutions in development</th>
<th>Key institutions in implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tunisia – improvement of building insulation</strong> NAMA</td>
<td>Ministry of Environment (responsible for international climate policy engagement)</td>
<td>ANME:</td>
</tr>
<tr>
<td></td>
<td>National Agency for Energy Conservation (ANME)</td>
<td>• Coordinator of NAMA, manager of subsidy</td>
</tr>
<tr>
<td></td>
<td>Ministry of Finance (responsible for approval of subsidy required)</td>
<td>• Accreditation of installers, materials and quality controllers</td>
</tr>
<tr>
<td></td>
<td>Ministry of Housing (responsible for regulatory framework relating to residential housing)</td>
<td>• Training and capacity building of installers, oversight of controllers</td>
</tr>
<tr>
<td></td>
<td>Banks (local, international)</td>
<td>• MRV of NAMA</td>
</tr>
<tr>
<td><strong>Morocco – Residential buildings energy efficiency</strong> NAMA</td>
<td>National Agency for the Development of Renewable Energy and Energy Efficiency (ADEREE)</td>
<td>ADEREE:</td>
</tr>
<tr>
<td></td>
<td>The Ministry of Energy, Mines, Water, and Environment (MEMWE)</td>
<td>• Coordinator of NAMA, technical oversight of CFL distribution, design of building code, development of appliance standards</td>
</tr>
<tr>
<td></td>
<td>Office National de l’Electricité (ONE) (utility)</td>
<td>• Managing subsidy for SWH purchase</td>
</tr>
<tr>
<td></td>
<td>Banks (local, MDBs, international)</td>
<td>• Accreditation of installers and equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MRV of NAMA</td>
</tr>
<tr>
<td><strong>Egypt – renewable energy investment</strong> NAMA</td>
<td>Ministry of Electricity and Energy (oversight of legislative package)</td>
<td>ONE and other independent operators:</td>
</tr>
<tr>
<td></td>
<td>Supreme Council for Energy</td>
<td>• CFL distribution</td>
</tr>
<tr>
<td></td>
<td>New and Renewable Energy Authority</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Egyptian Electricity Transmission Company (EETC)</td>
<td>Independent installers:</td>
</tr>
<tr>
<td></td>
<td>Egyptian Electric Utility and Consumer Protection Regulatory Agency</td>
<td>• Installation of SWH</td>
</tr>
<tr>
<td></td>
<td>Banks (local, international)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NREA:</td>
<td>Banks</td>
</tr>
<tr>
<td></td>
<td>• Possibly the coordinator of the NAMA</td>
<td>• Local – provision of soft loans to customers</td>
</tr>
<tr>
<td></td>
<td>• May not suited to broader implementation or fund management</td>
<td>• International – line of credit to local banks</td>
</tr>
<tr>
<td></td>
<td>EHHCC:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• transfer of feed-in tariff payments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ministry of Finance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• possible manager of RE fund</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• backing of feed in tariff payments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Banks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Local, international – contributions to fund, concessional finance for IPP investment</td>
<td></td>
</tr>
</tbody>
</table>
Financing requirements and opportunities

Detailed financing needs for each of the options would need to be estimated as a next step. For Option 1, estimates could be developed based on the proposed insulation PoA. For Option 2, estimates for the Government’s existing SWH programme, the first phase of the INARA CFL distribution programme and phase two GEF application could be drawn on, as well as the GEF funding application for a pilot building codes programme. For Option 3, the estimation of financing needs would require a more complex study to examine the generation mix that would be feasible to meet the 20% target under different assumptions.

International financing opportunities could potentially play a role in all of the options, but would be most appropriate for Option 2 - the Moroccan Residential Buildings Energy Efficiency NAMA and Option 3 - the Egyptian Renewable Energy Investment NAMA. For Option 1, the Tunisian Improvement of Building Insulation NAMA, our preliminary assessment based on the PoA is that the subsidy programme would be suited to a unilateral NAMA with the supported NAMA component mainly involving technical support. This is because the PoA was assessed as having a very high IRR due to paying for itself through reduced fossil fuel subsidies, a view also supported by South Pole, which rated its additionality as being low (Puhl et al, 2011). However, the role of international financial support to help kick start the NAMA and/or support the loans component of the NAMA could be explored further.

International financial support for NAMAs could be provided through various means – direct bilateral support, multilateral support through the climate finance mechanism being established under the UNFCCC, or via crediting under either the NAMA framework or sectoral crediting framework.

In the case of bilateral support, it is important to distinguish between financial assistance to help establish the NAMA in the implementing country, and financing for the actual investments that lead to emissions reductions once the NAMA is established. In the case of middle income countries, it may be more appropriate for donors to provide support for NAMA establishment, and perhaps initial funding assistance to help kick-start the investment activities. Private sector finance is typically restricted and/or uncompetitive due to lack of experience and risk premiums associated with financing investments in such countries. One approach that is being developed by some RCREEE member countries including Jordan and Egypt is to set up a fund through which donor countries can provide grants, loans or payment guarantees along with the national government, to help reduce the risks faced by private banks and other lenders involved in the financing of mitigation projects. Over time, once the initial projects have been demonstrated successfully, and risks have been shown to be manageable, private sector lenders are likely to offer more attractive lending terms and the role of public donors can be reduced.

The role of the implementing country government will arguably be more important in the case of NAMAs and sectoral crediting than has been the case under the CDM. Donor countries will be more willing to provide initial funding, and private lenders will be more likely to offer competitive terms to investors where there is a strong political commitment to implement the NAMA, including providing appropriate price signals and other incentives. Where subsidies or other economic instruments are to be used (eg. feed in tariffs), a sustainable model for the raising of funds is essential, particularly where long-lived assets such as power stations are concerned. For this reason, central agencies such as Ministry of Finance need to be closely involved in NAMA discussions and the design and implementation of NAMAs from a very early stage. In the CDM experience on the other hand, approvals and facilitation has largely been the domain of the Ministry of Environment, with ad hoc involvement of other agencies.

Financially supported activities to be undertaken under the NAMA framework will need to be discussed and previously agreed with the donors and would be closely scrutinized by the financing parties before funds or other forms of support are provided. More than one donor could be involved and different donors may choose to finance different activities under the NAMA. For example: one donor may choose to support the integration of new technologies while another party may support the administrative capacity building activities. This structure would generate a significant administrative workload in managing the inflow and outflow of funding. Therefore, we suggest the creation of a special administrative body to manage the NAMA resources and responsibilities in each country.

The framework for multilateral support under the UNFCCC is still being established. While parties agreed on the establishment of the Green Climate Fund in Cancun, its format and rules of procedure are not yet
Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

finalised. Similarly, the NAMA registry is still being designed. Further details may emerge following the climate change meetings in Durban. The COP is also to consider the establishment of new market mechanisms under the AWG-LCA track. This may see agreement to establish a new mechanism based on the high level framework described in this report. However, regardless of the level of progress made at Durban, there will be a need for pilot programmes to demonstrate how carbon finance arrangements can be structured.

The overview of the Egyptian renewable energy investment NAMA concept suggested further exploration of the financing of part of the mitigation efforts through a credited NAMA/sectoral crediting mechanism. The concept is that lower cost projects such as wind farms are more likely to be economic on the basis of feed-in tariffs that can be financed initially via seed funding and potentially other forms of support from donors that can help reduce the costs of finance. In the medium-long term the premium tariff component can be funded with the help of recycled subsidies generated through reduced fossil fuel consumption (freeing up gas for LNG export). Higher cost technologies would be likely to require additional, sustained financial support, and this could be financed from the sale of carbon credits under the NAMA crediting/sectoral crediting model.

To utilise the sectoral crediting model for this purpose, the establishment of an emissions benchmark for the Egyptian power sector would be required, against which overall sector performance would be measured. In addition to the feed-in tariff mechanism, the Egyptian government might employ other complementary measures to help meet this benchmark, such as plant efficiency upgrades, conversion of OCGT plant to CCGT plant etc. Given the highly concentrated nature of the Egyptian power sector, the sectoral crediting model would be well suited because there is less risk of sector under performance due to free-riding by individual generators.

For illustrative purposes, the figure below suggests a structure for the Egyptian renewable energy investment NAMA with crediting elements. As a next step, this model could be developed in more detail. To help maintain its simplicity, private sector lenders are not shown in the figure. They could be involved at different points including lending to investors, purchasing of carbon credits and potentially investing in the RE Development Fund itself.

Figure 4: Illustrative structure of a renewable energy development fund and crediting mechanism for Egypt

<table>
<thead>
<tr>
<th>International donors</th>
<th>Renewable Energy Development Fund</th>
<th>Egyptian Government</th>
<th>LNG export market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans, grants, and/or payment guarantees</td>
<td></td>
<td>Reallocated subsidy</td>
<td>Additional LNG export revenues generated by avoided gas use...</td>
</tr>
<tr>
<td>RED Fund pays premium component...</td>
<td>Investment in fund</td>
<td></td>
<td>Carbon credits</td>
</tr>
<tr>
<td>National utility or grid company</td>
<td>Utility pays avoided fuel cost... recovered from customers</td>
<td></td>
<td>Higher cost technologies require credits to top-off required tariff</td>
</tr>
<tr>
<td>Lower cost technologies funded by reallocated subsidy and donor support</td>
<td>Electricity sold to utility at premium tariffs...</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$</td>
<td></td>
<td>$$$$</td>
</tr>
</tbody>
</table>

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6. Options for RCREEE to get involved

There are a number of possible roles for RCREEE to get involved in the further development of a NAMA or sectoral crediting pilot for the MENA region. These are briefly outlined below. RCREEE could:

- Act as a facilitator of discussions around bilateral agreements with selected member states and potential donor countries, including discussions on the possible design of a sectoral crediting pilot.

- Use of NAMA opportunities to support its own regional priorities - for example, to remove institutional barriers and doubts that might exist in members states with regards to the potential for energy efficiency and renewable energy. In this respect, NAMAs can help signal a loud message that international support for policies/programmes is available.

- Act as the coordinator and implementer of capacity building for NAMAs in the region. All of the NAMA opportunities discussed in this report would require involvement of organizations that can play capacity building roles – coordination can help ensure efficiency use of scarce resources and more effective outcomes.

- Participate in the further development and implementation of NAMAs by providing capacity building on certain technical, legal, financial subjects. For example, by providing training programmes for installers of insulation and solar hot water systems.

7. Conclusions and next steps

The framework for utilising NAMAs and sectoral crediting for carbon finance is still emerging. Progress is being made in a number of areas, in particular in defining the MRV arrangements that would apply to different types of NAMAs and in establishing the framework for proposing and supporting NAMAs. Durban may see further advances in defining the framework for the new mechanisms and in fleshing out the key elements of the multilateral financing mechanism including the Green Climate Fund and the NAMA registry. There is still considerable opportunity to influence the detailed design of the international framework going forward.

The screening of NAMA potential in RCREEE member countries shows that there is considerable opportunity for NAMA development in the energy efficiency and renewable energy sectors. The preliminary assessment in this report identified several potential NAMA ideas, and suggests three promising NAMA ideas for further development are:

**Tunisia - improvement of building insulation NAMA.** To be explored primarily as a unilateral NAMA, with supported elements related to technical assistance and capacity building. Financial support could be explored further.

**Morocco - residential buildings energy efficiency NAMA.** To be explored as a comprehensive NAMA involving unilateral, supported and possibly credited elements.

**Egypt - renewable energy investment NAMA.** To be explored as a comprehensive NAMA involving unilateral, supported and credited elements, with the possibility for conceptualising as a sectoral mechanism.

As long as uncertainty prevails on the financing structure at the multilateral level, RCREEE member countries wanting to obtain finance for the further development of NAMA concepts are advised to do so through bilateral cooperation. Many bilateral donors are looking for promising opportunities to spend their fast-track finance pledges, especially if these entail high visibility projects in the MENA region. There are good reasons for such bilateral cooperation to include discussions with the EU on the basis of a sectoral crediting model if this is seen as appropriate by the implementing government.

In terms of next steps, RCREEE could consider undertaking a more detailed development of one or more of the identified NAMA opportunities, including detailed estimation of financing needs for a NAMA pilot and scoping of potential (industrialised) partner countries. The development of a sectoral crediting concept as a means of financing one or more NAMAs could also be explored.
8. References


Egypt (2010): Second National Communication under the UNFCCC.


EC (2010): Communication from the Commissions to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions. Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage, Brussels.


EC (2011c): Questions and answers on use of international credits in the third trading phase of the EU ETS.


Moroccan Ministry of Economic and General Affairs (2010): Partnership for Market Readiness (PMR) – Expression of interest in participating in the PMR.

Partnership for Market Readiness (PMR) (2011): Chair’s Summary of First Meeting of the Partnership Assembly, Barcelona.


Republic of Algeria (2011): Inventaire national des émissions de gaz à effet de serre de l’année 2000 (Second National Communication to UNFCCC)


UNFCCC (2011b): Compilation of information on nationally appropriate mitigation actions to be implemented by Parties not included in Annex I to the Convention.


Annex 1 – Algeria

NAMAs represent an opportunity for Algeria as the implementation of voluntary mitigation should enable it to integrate climate into development strategies and contribute to the achievement of sustainable development programmes based on developed countries cooperation: technology transfer, financial support and capacity buildings. Even if NAMAs are at still at the concept stage, Algeria should prepare itself in advance in order to take advantage of this new opportunity by initiating early preliminary work on NAMAs definition and NAMA framework setting up.

Algeria’s communications under the Copenhagen Accord stated that Algeria has undertaken several actions to reduce emissions, for example in reducing the flaring of gas associated with oil production. However, it has not made any specific NAMA pledges that are to be undertaken.

For the identification of potential NAMA ideas in Algeria, we have focused our analysis on the main mitigation measures announced by the Algerian government in the Renewable Energy and Energy Efficiency Programme 2011 and potential PoAs. In addition to the opportunities described below, there is excellent potential for NAMA development in the oil and gas sector in particular. The energy sector accounts for nearly 75% of Algerian emissions – some 87.6Mt CO$_2$-e (Republic of Algeria, 2010). In particular, there are considerable opportunities for reducing fugitive emissions from the production of natural gas, which amount to some 11 Mt CO$_2$-e. Given the focus of RCREEE on energy efficiency and renewable energy, the opportunity for a NAMA to exploit the oil and gas sector potential is not considered further, however, this could be done as a next step if there is sufficient interest.

The main mitigation ideas were assessed taking into account the following criteria:
- GHG mitigation potential
- Abatement cost
- Availability and maturity of technology
- Monitoring, reporting & verification (MRV)
- Links to national strategies and national plan
- Donor attractiveness
- Sustainable Development benefits

We think that the following measures could constitute potential NAMA ideas for Algeria:

**Development of CSP plants in Algeria**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Electricity generation sector</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>Algeria is firmly committed to the promotion of renewable energy in order to provide comprehensive and sustainable solutions to environmental challenges and to the problems regarding the conservation of the energy resources of fossil origin. The strategic choice is motivated by the huge potential in solar energy. This energy is the major focus of the RE programme of which solar power and photovoltaic systems constitute an essential part. Solar should achieve by 2030 more than 37% of national electricity production. The objective of this NAMA is therefore to help Algeria in developing its solar potential, which is one of the most important in the world, by launching major projects in solar thermal. Pilot projects for the construction of two solar power plants with storage of a total capacity of about 150 MW each, will be launched during the 2011-2013 period. These will be in addition to the hybrid power plant</td>
</tr>
</tbody>
</table>
Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

project of Hassi R'Mel with a total power capacity of 150 MW, including 25 MW in solar.
Four solar thermal power plants with a total capacity of about 1 200 MW are to be constructed over the period 2016-2020. The 2021-2030 programme provides for the installation of an annual capacity of 500 MW until 2023, then 600 MW per year until 2030.
The large part of the installed capacity is intended to meet the domestic electricity demand and the remaining for export. This last option depends on the availability of a demand that is ensured on the long term by reliable partners as well as on attractive external funding.

Measures and activities with direct impact on GHG emission reduction

- External funding
- Power sale to European partners
- Valorisation on the carbon market of the CO₂ emission reduction

Measures and activities with indirect impact on GHG emission reduction

- Assistance in the design and optimization of CSP plants
- Reinforcement of the electricity dispatching system in order to facilitate solar electricity penetration.
- Assistance to the programme coordinator for the development and the implementation of the MRV system related to the NAMA.

NAMA timeframe

- Implementation: 2011-2030
- Operation: 2011-2050

NAMA implementation and operation costs

- To be estimated

NAMA type

- Supported NAMA (with the possibility of NAMA crediting for parts of the actions)

Type of support required under the NAMA

- Financial: External funding
- Technical: Assistance in the design and optimization of CSP plants / Assistance for MRV system establishment

Residential buildings energy efficiency NAMA

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Residential building Sector, energy efficiency</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>Brief description</td>
<td>The concept is a comprehensive NAMA for the residential building sector which incorporates elements of the national energy strategy and is directly linked to the national energy conservation programmes in the building sector. The NAMA would utilise low cost measures utilising mature technologies. This includes a CFL distribution programme and a programme for insulating the roofs and vertical walls of private houses (new and existing buildings only). The measure will incorporate existing building regulations covering renovations. Subsidies to encourage the uptake of SHW are also envisaged. Although there is some local production, relatively low natural gas and butane prices mean that SHW suffers from a strong economic disincentive (GEF, 2008)</td>
</tr>
</tbody>
</table>
| Measures and activities with direct impact on GHG emission reduction | - CFL distribution - the programme will start with installation of 5 million CFLs and ramp up in line with the government strategy which intends to gradually prohibit the marketing of incandescent lamps with a total ban by 2020. Estimated market potential is 30 million CFLs.  
- Insulation programme – the short-term objective is to insulate 2,000 buildings by 2014 and ramp up beyond this timeframe |
### Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

<table>
<thead>
<tr>
<th>Measures and activities with indirect impact on GHG emission reduction</th>
<th>- Solar hot water (SHW) heater market development via subsidy and government backed loans – current national target is nearly 500,000m² of installed capacity by 2020 (GEF, 2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Capacity building of operators on insulation technologies and installations works</td>
<td></td>
</tr>
<tr>
<td>- Equipment of local authorities with relevant facilities for insulation material testing</td>
<td></td>
</tr>
<tr>
<td>- Assistance to APRUE for the development of programmes and the implementation of the MRV systems related to the NAMA.</td>
<td></td>
</tr>
<tr>
<td>- Promotional activities, consumer awareness etc</td>
<td></td>
</tr>
</tbody>
</table>

| NAMA timeframe | Implementation: 2011-2014  
Operation: 2011-2023 |
|---|---|

| Estimated emissions reductions | - CFL distribution: estimated potential for 2 MTCO2e  
- Thermal insulation: to be estimated  
- SHW market development: to be estimated |
|---|---|

<table>
<thead>
<tr>
<th>MRV approach</th>
<th>To be developed with support for ADEREE – suggest to base this on the CDM whole-building methodology “Energy efficiency technologies and fuel switching in new buildings” (AM0091), which allows for a simplified approach based on a 20% top performance benchmark expressed in terms of CO2/m²</th>
</tr>
</thead>
</table>

| NAMA type | Unilateral NAMA: to be explored – possible that this could cover part of the thermal insulation programme (financed through reduction of energy subsidies)  
Supported NAMA: support for APRUE to finance the SHW roll-out, technical assistance to APRUE to estimate baselines, develop MRV framework, training and accreditation of installers etc  
Credited NAMA: most suited to CFL programme given low domestic energy prices (highly additional) |
|---|---|
Annex 2 - Egypt

Despite some caution on the NAMA concept (Egypt did not yet make a NAMA submission to the UNFCCC), the Government of Egypt has shown a strong political commitment to the diversification of energy supplies. This is seen as a national priority for socio economic development in Egypt's long term “2020” vision: “Developing alternative energy resources and renewing resources that create natural wealth, and conserving oil and gas reserves.”

Egypt has already successfully achieved electrification of 99% of the country. The main challenge for the future is in meeting growing demand for energy, forecast to continue growing at around 6.5% over the 2010-20 period, which will require addition of around 30GW of new capacity – too big a task for the national utility, Egyptian Electricity Holding Company (EHCC), on its own due to already being highly geared (AfDB, 2010). Balancing security on the one hand and the rapid growth in greenhouse gas emissions on the other, in the context of declining oil reserves, the limited potential to increase large hydro capacity and the higher value of natural gas for export as LNG all point to increasing the role of renewables. In particular, the potential for wind and solar is now well recognised; Egypt is recognised as having world class resources in both.

The Second National Communication to the UNFCCC (Egypt, 2010) highlights the importance of the energy sector, which accounted for over 60% of total national emissions in 2000. Of this, the electricity generation sector accounted for some 35Mt CO2-e of emissions, which was over 33% of all energy-related emissions, and around 20% of total national emissions. The energy strategy adopted in by the supreme council in 2007 entails ensuring the long-term security of energy supplies, including introducing renewables and nuclear power in the energy mix; sustainability of current energy utilization; and the abatement of GHG emissions growth in the medium-term (Egypt, 2010). A target has been set to achieve 20% of demand to come from renewable sources by 2020, not including the contribution of large hydro.

The Egyptian Government has successfully attracted international attention and support for kick-starting its wind industry. The approach being taken is two-phased, with the first phase involving tendering for renewable energy by the national grid company, ETCC, and the second phase involving implementation of a feed-in tariff system. Significant regulatory reform is planned under the new National Electricity Law to introduce competition to the market and stimulate investment by the private sector. To date, investment in renewables has been dominated by the state-owned utility, EHCC, and the more recently established New and Renewable Energy Authority (NREA), which reports directly to the Ministry of Electricity and Energy (MOEE). Three independent Power Producers (IPPs) supply electricity to under 20-year contracts with EEHC.

Three wind farms (Zafarana I, IV and 8) have already been registered under CDM (see CDM report).

The transport sector also presents a range of major policy challenges and a significant opportunity for emissions reductions. In 2000, the sector accounted for some 30Mt CO2-e, around 26% of energy emissions or roughly 15% of national emissions (Egypt, 2010). The demand for energy in the transport sector has been growing at over 6% per annum, driven by the economic and population growth and the increasing pace of urbanization (World Bank Group, 2009). Road transport is the dominant mode of internal transport in both passenger and freight operations. In response, the Ministry of Transport has developed a strategy for improving national transport and urban traffic, in addition to controlling exhaust emissions from road-going vehicles in Egypt (Egypt, 2010). A wide range of measures are being implemented or considered, including increasing the role of electrified railways and inland waterways, higher penetration of CNG vehicles (already significant by global standards), and the introduction of metros and tramways in Cairo and Alexandria (Egypt, 2010). As outlined in the CDM report, there are a number of PoA projects underway in the transport sector, with one (Egypt Vehicle Scrapping and Recycling Programme) already registered and another (Scraping and Replacement programme of Two-stroke Motor cycle in Egypt ) currently in the pipeline.

Together, the energy and transport sectors are thus considered to have the most attractive mitigation potential. Due to this, and the high level of government commitment to addressing the social, economic and environmental challenges presented by these two sectors, they are considered the most appropriate candidates for the investigation of NAMA opportunities.
Due to the focus of RCREEE on the stationary energy sector, the selected NAMA opportunity focuses on the stimulation of renewable energy. A transport NAMA could be developed if there is further interest.

**Egyptian renewable energy investment NAMA**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Electricity generation sector</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
</tbody>
</table>
| Brief description                | The objective of the NAMA is to help the Egyptian Government achieve its objective of reaching 20% of demand being met from renewable energy sources by 2020 (not including large hydro). The NAMA covers existing government policy developments, and aims to leverage off of existing funding being provided for a wind development programme through the World Bank’s Clean Technology Fund, the European Investment Bank and bilateral financial institutions such as KfW (Germany) and AfD (France). The NAMA will involve two primary mechanisms:  
  - Introduction of a system of feed-in tariffs for a wide range of technologies (wind, solar PV, solar thermal, biomass, small-scale hydropower)  
  - Establishment of a RE support fund to back feed-in tariff payments – critical for encouraging private sector (IPP) investment due to the debt challenges faced by the national utility, EHCC  
In addition, the NAMA will incorporate the Government’s current regulatory reform agenda, designed to provide guaranteed third party access to the network, priority dispatch. |
| Measures and activities with direct impact on GHG emission reduction | Subsidizing the tariffs offered by EHCC to encourage more rapid penetration of RE sources, including via private sector (IPP) investment  
  o Targeting wind capacity of around 7200MW  
  o Solar (CSP and PV) |
| Measures and activities with indirect impact on GHG emission reduction | Reform of the regulatory framework to enable large scale renewable energy penetration via preferential dispatch, guaranteed network access  
  Supporting the New and Renewable Energy Agency (NREA), supporting the TSO with the integration of renewables into the grid, development of an MRV system and establishment of the RE support fund |
| Estimated GHG reductions         | Expected contribution of wind to reach target is 7200MW, which would reduce over 12 Mt CO\textsubscript{2}-e pa (World Bank, 2009)  
  Remaining 5000MW of other zero-emissions generation would result in savings of 113MtCO\textsubscript{2}-e by 2026/27 |
| MRV approach                     | Relatively straightforward for grid connected renewables – development of framework can be based on approach in CDM methodology ACM002 and other appropriate CDM methodologies |
| NAMA timeframe                   | To be defined                                                                                                                                |
| NAMA implementation and operation costs | To be estimated                                                                                                                             |
| NAMA type                        | **Unilateral NAMA:** in the medium-long term, the RE fund is designed to be self-financing through avoided domestic consumption of natural gas (for export as LNG at a higher value)  
**Supported NAMA:** financial contributions (loans, grants and/or payment guarantees) to back feed-in tariff payments; technical assistance  
**Credited NAMA:** to be explored - could be linked to the achievement of part of the target (higher cost technologies) |
Annex 3 - Jordan

Jordan submitted its first and second national communications to the UNFCCC in 1997 and 2009 respectively. Following the Copenhagen Accord, Jordan submitted a list of 24 broad NAMA ideas in 6 sectors as presented by the following table:

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number of NAMA ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>5</td>
</tr>
<tr>
<td>Energy</td>
<td>5</td>
</tr>
<tr>
<td>Environment</td>
<td>7</td>
</tr>
<tr>
<td>Waste sector</td>
<td>2</td>
</tr>
<tr>
<td>Agriculture and forestry</td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 1. NAMAs ideas submitted by Jordan to the UNFCCC. Source: UNFCCC.


In Jordan, energy security is the primary policy objective - there is no specific GHG emission reduction strategy in Jordan with an explicit mitigation target at either the macro or sector level.

In the following, the proposed pilot NAMAs were identified based on the documentation and the meeting with the main stakeholders. Some key criteria were considered for their selection:

- GHG mitigation potential
- Abatement cost
- Availability and maturity of technology
- Monitoring, reporting & verification (MRV)
- Links to national strategies and national plan
- Donor attractiveness
- Sustainable Development benefits

Based on these criteria, three relevant NAMAs were identified for pilot projects:

1. Wind and solar energy development programme in Jordan. In fact, the national energy strategy in Jordan aims at covering 10% of primary energy needs of the country by 2020 by using renewable energies. It is expected the implementation of 600-1000 MW of wind by 2020 and 300-600 MW of solar (PV, CSP and solar hot water). Most probably, these projects will not benefit from CDM, as they will be installed after 2012. For that reason, it seems relevant to propose them under a NAMA framework.

2. Demand-Side Energy Efficiency Programme for Water Pumping Stations in Jordan. The idea is to transform the proposed PoA (see CDM report) to a NAMA, if it is determined that it is not possible to register it before 2012.

3. City Wide mitigation programme of Greater Amman Municipality. As mentioned in the CDM report, it was expected that this project will be presented as a PoA by the Greater Municipality of Amman with the help of the World Bank. Considering that it may not be possible to register it before 2012 and considering its high GHG reduction potential, it is proposed to develop it as a NAMA.
The three NAMAs are summarized hereafter:

### Wind and solar energy development programme in Jordan

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Electricity generation sector</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>Jordan is highly dependent to abroad for its energy supply (96%). The government of Jordan has developed an energy sector strategy based inter alia on energy efficiency and renewable energy promotion. The current national policy objective is to reach 10% of RE in the nation primary energy mix by 2020 from a combination of sources. It is targeted to implement 600-1000 MW of wind energy and 300-600 MW solar energy (CSP, PV and solar hot water) by 2020. The objective of the NAMA is to help the Government in achieving these targets. To cover the difference between the fuel marginal cost of conventional electricity generation and the required selling price for the targeted wind and solar projects, a Renewable Energy and Energy Efficiency Fund (JREEF) has been set up within the context of Jordan’s renewable energy policy. The Fund will receive annual budget allocations and international contributions. This support will be particularly required in the first part of the programme. By implementing the policy framework as a NAMA, the possibility for financing investments through crediting is also created. Also, the integration of wind energy to the grid will require technical assistance to NEPCO and Ministry of Energy to enhance their capacity in wind energy management.</td>
</tr>
</tbody>
</table>

Measures and activities with direct impact on GHG emission reduction
- Subsidizing, when necessary, the over cost between fuel marginal cost of conventional electricity generation and the selling price that would make wind and solar projects attractive for private investors.
- Valorisation on the carbon market of the CO₂ emission reduction (estimated emissions reduction potential of around 1 MtCO₂e per year if 600MW of wind and 600MW of solar is implemented by 2020, but noting that not all emissions reductions would result in credits) in order to improve attractiveness of the projects to private investors.

Measures and activities with indirect impact on GHG emission reduction
- Capacity building of NEPCO and Ministry of Electricity on the management of wind energy and its integration in the electricity system, including help with short term forecasting
- Reinforcement of the electricity dispatching system in order to facilitate wind electricity penetration
- Assistance to NEPCO for the development and the implementation of the MRV system related to the NAMA

NAMA timeframe
- Implementation: 2013-2020
- Operation: 2013-2030

NAMA implementation and operation costs
- Investment subsidies required to make wind and solar energy projects attractive for the investors (to be estimated).
- Technical assistance to NEPCO and MEMR estimated to around 4 million euros.

NAMA type
- Supported NAMA
- Credited NAMA

Type of support required under the NAMA
- Financial: Investment subsidy and soft loans
- Technical: Assistance to NEPCO and MEMR
### Demand-Side Energy Efficiency Programme for Water Pumping Stations in Jordan

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Water sector / Energy Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Water Pumping</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>Fresh Water distribution system in Jordan is one of the biggest electricity consumers in the country, with around 15% of total electricity consumption. Because of insufficient quality of operation and maintenance as well as bad selection of the right pump technology, there is a big potential for energy saving in the current water distribution system. The Ministry of Water and Irrigation, with the support of GIZ, has developed a PIN for a PoA on energy efficiency in the pumping stations based on ESCO approach. However, taking in account the status of this programme and the methodological complexity, the registration of this PoA before the deadline of end 2012 may be difficult. While the primary focus should be on pursuing PoA registration, the PoA could be translated into a NAMA in order to be able to valorise the emission reduction after 2012 and then improve the attractiveness of the project for the ESCOs.</td>
</tr>
<tr>
<td>Measures and activities with direct impact on GHG emission reduction</td>
<td>Valorisation on the carbon market of the CO₂ emission reduction, estimated in average to around 64 ktCO₂e per year.</td>
</tr>
<tr>
<td>Measures and activities with indirect impact on GHG emission reduction</td>
<td>Capacity building of the staff of Water Authority on various aspects related to energy efficiency in pumping systems: operation &amp; maintenance procedures, energy efficiency, energy efficiency measurements and energy audits for pumping station, computer skills &amp; pump station automation, structuring working procedures, effective institutional communication, etc. Assistance to the development and the implementation of the MRV system related to the proposed NAMA.</td>
</tr>
<tr>
<td>NAMA implementation and operation costs</td>
<td>Technical assistance to Water Authority estimated to around 1 million euros.</td>
</tr>
<tr>
<td>NAMA type</td>
<td>Supported NAMA Crediting NAMA</td>
</tr>
<tr>
<td>Type of support required under the NAMA</td>
<td>Technical support to Water Authority</td>
</tr>
</tbody>
</table>

This NAMA would be developed in **collaboration with GIZ** who is supporting the Ministry of Water in this programme.

### City Wide mitigation programme of Greater Amman Municipality

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy, Transportation, municipal waste, Urban forestry</td>
</tr>
<tr>
<td>Sub-sector</td>
<td></td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Greater Amman Municipality</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>In May 2010, the Carbon Partnership Facility and the Greater Amman...</td>
</tr>
</tbody>
</table>
Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

Municipality signed a Seller Participation Agreement for the Amman Green Growth Programme, representing the first city-wide PoA in the world. The PoA includes emission reduction opportunities in municipal waste, urban transport, sustainable energy, and urban forestry. However, no base line methodology exists at the moment for such kind of PoA and a new methodology has been submitted by the World Bank to the UNFCCC Executive Board, but not approved yet.

Since it may now be unlikely that the PoA will be registered before 2012, the idea is to develop this programme under the NAMA approach.

| Measures and activities with direct impact on GHG emission reduction | • Investment subsidy for some measures in some sectors (to be identified)  
| • Valourisation on the carbon market of the CO2 emission reduction, estimated in average to around 560 ktCO2e per year. |
| Measures and activities with indirect impact on GHG emission reduction | • Capacity building of the Municipality staff on EE, RE, sustainable transportation modes, waste to energy approach, etc.  
| • Assistance to the development and the implementation of the MRV system related to the proposed NAMA |
| NAMA timeframe | • Implementation: 2013-2016  
| • Operation: 2013-2030 |
| NAMA implementation and operation costs | • Investment subsidies (to be estimated)  
| • Technical assistance to Greater Amman Municipality (To be estimated) |
| NAMA type | • Supported NAMA  
| • Crediting NAMA |
| Type of support required under the NAMA | • Financial: Investment subsidy and soft loans.  
| • Technical support to Greater Amman Municipality |

This NAMA should be developed in collaboration with Word Bank which has initiated the approach with Amman Municipality.

Other NAMA opportunities

Another NAMA opportunity suggested by stakeholders is for the utilization of waste from the olive oil industry. Jordan has a high potential of olive cake due to the large volume of waste generated by more than 15 million olive trees in the country, producing about 80,000 tonnes of olive cake every year (M.I. Al-Widyan, H.F. Al-Jalil, M.M. Abu-Zreig and N.H. Abu-Hamdeh, 2002: Physical durability and stability of olive cake briquettes. Canadian Biosystems Engineering/Le génie des biosystèmes au Canada 44: 3.41-3.45). It was suggested by stakeholders from the Energy Research Program/National Centre for Research & Development (NERC) that the national potential could be about 39,000 tonnes per year — seen therefore as a more realistic potential. Olive residues have been tested successfully by NERC in a circulating fluidized bed combustion facility. If the olive residues can be converted to electricity and replace fossil fuels, this potential energy source could help contribute towards the government’s target of reaching 10% of energy coming from renewable sources by 2020 and could potentially lead to the creation of credits under the NAMA framework. Another possibility is to use thermal energy in industrial applications, for example under the CDM framework the project “Fuel oil to vegetable biomass switching at Lesieur Cristal Limited Corporation” in Morocco (currently under validation – see the CDM report), which utilises methodology AMS I.C - Thermal Energy for the user with or without electricity.

Further information is required before this idea could be fully developed into a NAMA concept.
Annex 4 - Lebanon

Lebanon submitted its first and second national communications to the UNFCCC in 1999 and 2011 respectively. Following Copenhagen agreement, Lebanon did not submit to the UNFCCC any list of potential NAMA ideas. However, the second National Communication included a GHG Mitigation assessment; describing mitigation plans, actions and measures in the five major GHG sources:

- Energy
- Industry
- Agriculture
- Forestry
- Wastes

The implementation of the mitigation programme would generate almost 20 million tons of CO2 Eq. of emission reductions by the year 2030. Measures to be implemented in the electrical sector contribute to 2/3rd of the mitigation potential, while waste sector would account for around 15% and transport 11%.

The National Energy Efficiency Action Plan for Lebanon (NEEAP 2011-2015), describes a range of specific initiatives that might be translated into NAMAs:

- Implementation of a CFL promotion programme.
- Solar Water Heaters for Buildings and Institutions.
- Paving the Way for Energy Audit and ESCO Business.
- Promotion of Energy Efficient Equipment.

In addition, the NEEAP provides a number of short term objectives, particularly for the electricity sector:

- Promotion of 50 to 100 MW of decentralized PV and Wind Applications, for Power Generation by 2015, in the Residential and Commercial Sectors.
- Installing 60 to 100 MW of wind power generation by 2014.
- Installing 100 to 200 MW of Photovoltaic (PV) and Concentrated Solar Power (CSP) over the period 2011-2015
- Installing additional capacity of 100 MW of Hydropower\(^{10}\) over the period 2010-2015.
- Installing 15 to 25 MW of waste to energy conversion techniques geothermal power by 2014.
- Setting up a building energy efficiency code for new buildings and major retrofits in Lebanon.

Based on mitigation assessment and NEEAP, as well as further discussions with the main stakeholders in Lebanon, it was possible de identify a list of potential NAMAs, all of which have effective Links to national strategies, plans and development priorities. The following criteria were considered for selecting a shortlist:

- Maturity of the idea under Lebanese circumstances, and availability of the technology
- GHG mitigation potential
- Ease of establishing Monitoring, reporting & verification (MRV) system
- Sustainable Development benefits
- Donor attractiveness.

\(^{10}\) Of which 20 to 30 MW would result from the rehabilitation of existing hydro power plants.
Using these criteria, thirteen relevant NAMAs are suggested and ranked by order of priority as follows:

- Reducing GHG emission factor per GWh of the Electrical sector in Lebanon.
- Reducing GHG emission factor per ton of landfilled Solid Waste in Lebanon.
- Public transport development in greater Beirut.
- Reducing carbon intensity of the cement production in Lebanon.
- Intercity Rail Transport Development in Lebanon.
- Improving Energy Efficiency in buildings in Lebanon.
- Improving Energy Efficiency in Electrical Appliances in Lebanon.
- Improving energy performance of the whole lighting end uses in Lebanon.
- Increase of the Renewable Energy contribution to the Final Energy consumption in Lebanon.
- Increase of Biomass-Energy contribution to the energy consumption in Lebanon.
- Promotion of cleaner production in industrial sector through Energy Efficiency (Audits and ESCOs) and fuel switching.
- Fuel switching into LNG in transport sector.

Based on respective maturities of these programmes, as well as GHG mitigation potential, two NAMAs from the above list are presented below:

- Reducing GHG emission factor per GWh of the Electrical sector in Lebanon
- Public transport development in Lebanon

Other potential NAMAs that were regarded as having considerable potential included a NAMA targeting methane emissions reductions from solid waste (landfills) and use in electricity generation (captured in the electricity sector NAMA described below) and a NAMA targeting emissions reduction in the cement sector. These could be described further if there is significant interest from RCREEE.

### Reducing GHG emission factor per GWh of the Electrical sector in Lebanon

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Electricity generation sector</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>Lebanon is highly dependent on imported fuel oil and gasoil to generate electricity. Furthermore, 1/4(^{th}) of its electricity is self-produced by consumers, leading to low performances and efficiencies. 7-8% of the electricity is also imported from Syria and Egypt, resulting in higher dependency on specific energy and political circumstances of these countries. The government of Lebanon has also developed an electrical sector strategy(^{11}) emphasizing on the development of renewable energy, on fuel switching to natural gas, and on improving the performances of the electrical sector as a whole. Lebanon is well endowed with Hydro, solar and wind potential, but these are not yet mobilized due to financial, regulatory and technical constraints. The idea of the NAMA would be to mobilise financial resources to support the government’s strategy to reduce the emission factor of…</td>
</tr>
</tbody>
</table>

the electricity produced in Lebanon by 40%. Simulations for a baseline considering a business as usual scenario would lead to an emission factor of the domestic electricity generation (including auto-producers) of 0.800 tCO2/GWh produced. The NAMA scenario would target 0.490 tCO2/GWh.

In addition, it is suggested to include the reduction of technical transport and distribution losses from 15% to 12% by 2020, as a part of the NAMA objectives.

Emission reductions would totalize 8.5 million tons of CO2 Eq. by 2020; of which 0.4 would result from reduction of transport and distribution losses, and 8.1 would come from the other emission reduction sources.

| Measures and activities with direct impact on GHG emission reduction | • Opening the electrical market to private sector by implementing new regulations  
• Rehabilitate existing hydro installations  
• Promoting Electricity generation from Renewable energy (hydro, wind, solar, geothermal, etc.), through advantageous feed-in tariffs, and specific financial mechanisms  
• Implement infrastructure for natural gas, as defined in «Plan Stratégique national pour le secteur de l'électricité».  
• Implement an ambitious programme to reduce technical losses  
• Valorisation of the emission reductions in the carbon market, particularly for private sector |
| Measures and activities with indirect impact on GHG emission reduction | • Assistance to Ministry of Energy to define new electrical regulations  
• Capacity building of EDL on the management of the grid with stronger contribution from private sector.  
• Capacity building of EDL on management of the electricity dispatching system with stronger contribution from renewable energy, particularly wind power.  
• Assistance to Ministry of Energy and EDL to precisely define the NAMA (quantitative objectives, detailed measures, funding needs, etc.)  
• Assistance to EDL for the development and the implementation of the MRV system related to the NAMA. |

| NAMA timeframe | Implementation: 2012-2020  
Operation: 2012-2030 |
| NAMA implementation and operation costs | • Investment subsidies required to implement the identified measures  
• Financial support to feed Technical assistance programmes |
| NAMA type | • Supported NAMA  
• Crediting NAMA (to be explored as a financing opportunity) |
| Type of support required under the NAMA | • Financial: grants to support public sector investment programme; investment subsidies and soft loans to stimulate private sector involvement in market; |
Public transport development in Lebanon

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy, Transportation</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Public transportation</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Whole of Lebanon</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>The transportation sector is a major energy consumer in Lebanon. It contributes to 43% of the Final Energy Consumption. This is mainly due to the inexistence of rail transportation, and to the weak public transportation, and thus to the prominence of a relatively old fleet of private road transportation. The Second National Communication of Lebanon described two major mitigation measures targeting the transport sector. The idea is to integrate these measures into one NAMA along with a further measure suggested by stakeholders from the Lebanese government:</td>
</tr>
<tr>
<td></td>
<td>• The revitalization of the Public Transport System in greater Beirut, through a significant improvement (qualitative and quantitative) of the public buses fleet, and the implementation of dedicated lanes for buses. The objective of the NAMA would be to reach a 50% distribution of passenger-trips travelled by public transportation</td>
</tr>
<tr>
<td></td>
<td>• A car-scraping programme, involving 40,000 old vehicles</td>
</tr>
<tr>
<td></td>
<td>• Intercity Rail Transport Development in Lebanon. The Ministry of Public Works and Transportation (MPWT) is understood to be considering a rail link from the northern border of the country through Tripoli to the Port of Beirut. By integrating these measures, the emission reductions conservative estimates would totalize 1.35 million tons of CO\textsubscript{2}-Eq by year 2020; of which 0.5 million tons of CO\textsubscript{2}-Eq would come from car-scraping programme and 0.85 million tons of CO\textsubscript{2}-Eq would result from the revitalization of the Public Transport System in greater Beirut. The emissions reduction potential of the rail infrastructure plan would require significant further information before its emissions reduction potential could be estimated.</td>
</tr>
<tr>
<td>A range of other potential policy measures for the transport sector are outlined in the Lebanese Government’s second national communication (2011): these include tax incentives, improved efficiency standards, and logistics improvements. Over time, the NAMA could be designed to cover many of these potential options.</td>
<td></td>
</tr>
<tr>
<td>Measures and activities with direct impact on GHG emission reduction</td>
<td>• Scraping of 40,000 old vehicles</td>
</tr>
<tr>
<td></td>
<td>• Elaboration and implementation of a Public transportation Strategy and Action Plan for Greater Beirut</td>
</tr>
<tr>
<td></td>
<td>• Introduction of electric rail links between major cities (in the long term)</td>
</tr>
<tr>
<td>Measures and activities with indirect impact on GHG</td>
<td>• Capacity building of the MPWT and Municipality staff of Beirut on sustainable transportation modes</td>
</tr>
</tbody>
</table>
### Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

| emission reduction | • Implementation of partnership programmes with experienced cities in the world (e.g. Barcelona)  
|                    | • Assistance to precisely define the NAMA (quantitative objectives, detailed measures, funding needs, etc.)  
|                    | • Assistance for the development and the implementation of the MRV system related to the NAMA |
| NAMA timeframe     | • Implementation: 2012-2020  
|                    | • Operation: 2012-2030 |
| NAMA implementation and operation costs | • Mobilization of the financial needs required to implement the identified measures  
|                    | • Investment subsidies (to be estimated)  
|                    | • Financial support to feed Technical assistance programmes |
| NAMA type          | • Supported NAMA  
|                    | • Crediting NAMA |
| Type of support required under the NAMA | • Financial: grants and soft loans to meet the investment cost requirements  
|                    | • Technical: Assistance for MPWT and Municipality in designing and implementing measures |
Annex 5 - Libya
In Libya, there is no CO\textsubscript{2} emission reduction strategy with explicit mitigation target on the long term, neither at macro level nor at sector level. Even in the energy sector where an energy efficiency and renewable energy strategy was developed, nothing is mentioned about emission reduction objectives.

Despite the absence of specific work on CDM project portfolio identification and more generally on mitigation options, we have identified a potential NAMA for Energy efficiency in residential building sector.

As the largest electricity consumer, the building sector has shown a high demand increase rate during the last years of about 10% per year. Moreover, the building sector seems to be largely low energy efficient compared to the neighboring countries because of the low efficiency of the construction and the used appliances. For these reasons, it would be relevant to develop a NAMA including a set of measures aiming at improving the efficiency in the residential sector.

**Energy efficiency in residential building sector**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Building sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Residential</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
</tbody>
</table>
| NAMA context and justification                   | Building sector including residential and tertiary sectors is the first consumer of electricity with a share of 42% of total electricity consumption. Alone, the residential sector is consuming around 30% of national demand.  

The consumption of the residential sector has increased very fast during the last years with about 10% per year. This increase can be explained by many factors:  

- The increase of revenues and life standards which imply the intensification of the appliance equipment rate of households (air condition, refrigerator, large TV, etc.)  
- The crucial decrease of the appliances prices, mainly coming for China which accelerate the purchase of these appliances by the households  
- The inefficiency of the major part of the appliances on the Libyan market because of the absence of quality control  
- The thermal inefficiency of the construction due to the absence of building thermal code and the lack of awareness.

For these reasons, the average specific electricity consumption for residential building is very high (37 kWh/m\textsuperscript{2}/year) compared to those in Algeria or Tunisia (around 14 kWh/m\textsuperscript{2}/year). Of course there is some difference between the contexts of the 3 countries, but there are also a lot of similarities: rate of electrification, rate of household’s equipment, etc.

Given, the current grid emission factor, the specific emission will be around 33 kgCO\textsubscript{2}e/m\textsuperscript{2}/year in Tunisia and Algeria.

The Idea is to propose a NAMA that target the residential building sector and aim at reducing by half the current average specific emission in this sector, by 2023.

| Measures and activities with direct impact on GHG emission reduction | To reach this target the NAMA proposes a set of measures as following:  

Building thermal code for new constructions  
Labeling and minimum energy efficiency standards of electrical appliances (air condition, refrigerator, large TV, etc.) |
condition, refrigerators, lighting, etc.)

Solar water heater market development with the objective to install at least 250,000 m² by 2023

Generalization of the use of the efficient lighting by the interdiction of the conventional bulbs on the local market.

| Measures and activities with indirect impact on GHG emission reduction | These measures consist mainly at technical assistance to the local concerned institutions and stakeholders (REAOL, GECOL, Housing Ministry, private sector, local experts, etc.) regarding the following aspects:
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>• Assistance to develop and implement the thermal code for the new residential buildings;</td>
</tr>
<tr>
<td>• Assistance for the development and the implementation of the labeling and the minimum energy efficiency standard for the main appliances;</td>
</tr>
<tr>
<td>• Assistance to set up incentive and promoting mechanism for solar water heater use</td>
</tr>
<tr>
<td>• Information and awareness rising of households on energy efficiency (SWH, efficient appliances, efficient construction, etc.)</td>
</tr>
<tr>
<td>• Capacity building on energy efficiency technologies in construction;</td>
</tr>
<tr>
<td>• Assistance for the development and the implementation of the MRV system related to the proposed NAMA.</td>
</tr>
</tbody>
</table>
| NAMA timeframe | Implementation: 2013-2023  
Operation: 2013-2033 |
| NAMA implementation and operation costs | To be estimated on the base of a specific study |
| NAMA type | Supported NAMA |
| Type of support required under the NAMA | Soft loans and grants to kick start investments.  
Technical support to concerned organism and stakeholders. |
Annex 6 – Morocco

Morocco launched its National Plan Against Global Warming at Copenhagen in 2009, and has submitted a wide range of NAMAs to the UNFCCC for the following sectors: energy (17 measures), transport (6 measures), industrial (6 measures) waste (3 measures) agriculture (1 measure), forestry (2 measures) and housing (8 measures).

Moreover, Recently (2011) Morocco with the support of the World Bank has developed the following NAMAs:

- Morocco Solar Plan NAMAs including 2000 MW of CSP. This programme is developed by MASEN as crediting and supported NAMAs.
- Wind energy NAMAs including all the projects that will be developed after 2012 with a total capacity of more than 1000 MW. It is developed by ONE as crediting and supported NAMAs.
- The solid waste NAMAs including the PNDM programme, developed by the FEC as supported NAMAs including technical assistance to the municipalities in order to speed up the CPA inclusion to the PNDM PoA.

The major national policies and strategies for the energy sector include the National Energy Strategy (2010) the short-term National Plan of Priority Actions (NPPA), which focuses on the period 2008-12. The Energy Strategy aims at increasing the installed capacity of renewables to 42% of the mix by 2020, including specific targets of 2000MW each of solar CSP and wind power. On energy efficiency, there are plans to realised savings of 12-15% by 2020, and 20% by 2030.

In the framework of the present mission, pilot NAMAs were identified based on some key criteria:

- GHG mitigation potential
- Abatement cost
- Availability and maturity of technology
- Monitoring, reporting & verification (MRV)
- Links to national strategies and national plan
- Donor attractiveness
- Sustainable Development benefits

Based on these criteria, 2 relevant NAMAs were identified as pilot projects:

- **Residential buildings energy efficiency NAMA.** This NAMA would incorporate a number of measures, building on existing and planned government initiatives:

  - **Solar water heater market development.** The Government of Morocco has defined an ambitious strategy aiming at reaching an installed capacity of approximately 1.7 million square meters in 2020. For that reason the ADEREE is setting up a national programme based on a specific financial mechanism to overcome the economic market barriers including 2 main components: A public subsidy of SWH price and a bank loan with appropriate conditions. As mentioned before, this programme could be developed as PoA, however, the time is very slight to register it before 2012. So, the idea is to develop a NAMAs in order to valorise the emission reduction generated by the programme on the carbon market and attract also funding for supporting measures.

- **Expanded CFL distribution.** Under the NPPA, Morocco aims to distribute some 23m CFLs to reduce peak load, with an estimated mitigation potential of 490 kt CO2/year (FCCC, 2011). The programme has incurred considerable delays and needs to be strengthened to reach the target by 2014 (GEF, 2011). The national utility, ONE, has completed the first phase (5m CLFs) of its three-phase “INARA” CFL distribution programme aimed at replacing 15m incandescent light bulbs (ILs). The second phase is to be implemented towards the end of 2011, with funding assistance from the KfW (Galil, 2011). Morocco has also applied for funding through the GEF to assist with the second
and third phases of INARA. The NAMA would involve Morocco rolling out the remaining 8m CFLs (to meet its goal of 23m), with additional emissions reductions roughly estimated at 170 kt CO2/year.

- **Implementation and enforcement of residential building codes.** Building regulations for new constructions are currently under development, supported with an application for GEF funding for a scheme covering 400,000 new houses over 2009-13. Building codes would reduce the consumption of fossil fuels used for cooling and heating, for example by requiring the use of insulation, thus reducing associated GHG emissions. The programme would have the added benefit of improving energy security. Mitigation potential to be estimated.

- **Energy-saving labelling of domestic appliances.** Morocco’s second national communication and Copenhagen Accord pledges included the introduction of energy-saving labeling, especially for refrigerators and air conditioners. The estimated mitigation potential of such a scheme was estimated at: 779 kt CO2/year (FCCC, 2011).

- **Other measures.** The NAMA could also potentially incorporate other measures, such as the “20-20 initiative” in which households achieving a 20% reduction in energy usage benefit from an additional 20% rebate on their bill.

- **Demand-Side Energy Efficiency Programme in industry sector.** The energy sector is the first energy consumer in Morocco with around 2 Mtoe per year. In line with the national strategy, Morocco Government, with the help of the GEF/AfDB, is preparing an energy efficiency programme in the manufacturing sector based, among others, on specific financial incentives and demonstration projects. The idea is to add to these components, the valorisation of the GHG emission reduction on carbon market through the new mechanism of NAMAs.

The two NAMAs are summarized hereinafter:

### Comprehensive residential buildings EE NAMA

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Residential building Sector, energy efficiency</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>Brief description</td>
<td>The concept is a NAMA for the residential building sector which incorporates several measures including subsidies for the uptake of SHW systems (currently being developed by ADEREE), acceleration of a CFL distribution programme that is experiencing delays (programme being implemented by the national utility, ONE, with a recent GEF funding application), and measures related to the thermal performance of buildings (building codes, insulation programme) and energy efficiency labelling of appliances.</td>
</tr>
</tbody>
</table>
| Measures and activities with direct impact on GHG emission reduction | • Solar hot water (SHW) heater market development  
• Acceleration of CFL distribution – additional 8m CFLs need to be distributed to meet target of 23m by 2014  
• Insulation programme – to be further defined |
| Measures and activities with indirect impact on GHG emission reduction | • Energy-labelling of domestic appliances (refrigerators and air-conditioners)  
• Implementation and enforcement of national residential building codes  
• Training, accreditation and capacity building of local installers  
• Promotional activities, consumer awareness etc |
| NAMA timeframe              | Implementation: 2012-2014  
Operation: 2012-2030 |
| Estimated emissions reductions | • SHW market development: 270 ktCO2e per year  
• Acceleration of CFL distribution: 170 ktCO2/year |
### MRV approach

To be developed with support for ADEREE – certain elements can either draw on CDM whole-building methodology “Energy efficiency technologies and fuel switching in new buildings” (AM0091), or small scale methodologies for individual actions (such as AMS-II.C, AMS III-AE).

### NAMA type

- **Unilateral NAMA:** provision of subsidies for SHW systems; introduction of building code, insulation programme
- **Supported NAMA:** provision of concessional loans to finance SHW roll-out, technical assistance to ADEREE to develop MRV framework, energy labelling scheme, building code, training and accreditation of insulation installers etc
- **Credited NAMA:** most suited to acceleration of CFL programme

- Building codes, insulation: to be estimated
- Energy labelling: 780 ktCO2/year
## Demand-Side Energy Efficiency Programme in industry sector

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Industry sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Manufacturing industry sector</td>
</tr>
<tr>
<td>NAMAs boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>NAMAs context and justification</td>
<td>Industrial sector is the biggest energy consumers in Morocco with 29% of total final energy consumption. The manufacturing sector, a sub-sector of the industrial sector, is energy intensive and consumes some 2 Mtoe as it is made up of a stock of some 7,840 manufacturing units mostly set up in the seventies. Out of these, a total of 1855 made up of 53 high energy intensive industries and 1802 light industries, account for almost 90% of the total energy consumed by the manufacturing sector. Energy audits carried out in the recent past have shown that there is a significant potential for EE improvements in these units. However, a number of barriers have so far prevented investment in EE in the manufacturing sector. These barriers range from lack of institutional and legal framework, to lack of trained manpower, insufficient information on technology and constrained access to finance. The Government of Morocco with the support of the GEF/AfDB is seeking to set up a national programme of energy efficiency in manufacturing sector in order to address these issues so as to enable EE investment in the manufacturing sector (mostly targeting the 1855 units). This programme aims to achieve a cumulated reduction of over 2 Mtoe in energy consumption and an corresponding GHG reduction of 8 MtCO₂e over the 10 year horizon stretching to 2020 by the successful implementation of the five components:</td>
</tr>
<tr>
<td></td>
<td>- Institutional and regulatory framework to support EE law;</td>
</tr>
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<td></td>
<td>- Demonstration of pilot EE projects;</td>
</tr>
<tr>
<td></td>
<td>- Subsidies of energy audits and EE investment feasibilities;</td>
</tr>
<tr>
<td></td>
<td>- Training and accreditation of certified energy managers;</td>
</tr>
<tr>
<td></td>
<td>- Information dissemination, communication and EE promotion</td>
</tr>
<tr>
<td>Measures and activities with direct impact on GHG emission reduction</td>
<td>Valorisation on the carbon market of the CO₂ emission reduction, estimated in average at around 800 ktCO₂e per year.</td>
</tr>
<tr>
<td>Measures and activities with indirect impact on GHG emission reduction</td>
<td>Assistance to the development and the implementation of the MRV system related to the proposed NAMAs. This will include the design and the implementation of a relevant information system providing the required indicators for the MRV.</td>
</tr>
</tbody>
</table>
| NAMAs timeframe          | Implementation: 2012-2016  
|                         | Operation: 2012-2020       |
| NAMAs implementation and operation costs | Technical assistance ADEREE: 0.5 M€ |
| NAMAs type              | Supported NAMAs           
|                         | Crediting NAMAs           |
| Type of support required under the NAMAs | Technical support to ADEREE |

This NAMAs should be developed in **collaboration with AfDB** who is supporting ADEREE for this programme.
Annex 7 - Syria

Aside from the first national communication Syria has undertaken no initiative to examine NAMA development opportunities in the country. Considering the technology transfer, financial support and capacity buildings opportunities channelled through this mechanism, Syria should prepare itself in advance in order to take advantage of this new opportunity. On the basis of the Ministry of Environment publications and international agencies reports on Syria, we have screened the main NAMAs ideas in Syria and selected the potential ones according to the following criteria:

- GHG mitigation potential
- Abatement cost
- Availability and maturity of technology
- Monitoring, reporting & verification (MRV)
- Links to national strategies and national plan
- Donor attractiveness
- Sustainable Development benefits

The following measures were identified as potential NAMAs ideas for Syria:

**Promotion of Solar Water Heating Systems**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Building sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Renewable Energy Technology</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>Measures and activities with direct impact on GHG emission reduction</td>
<td>Set up of a financial mechanism allowing the end user to purchase a good quality SWH at an attractive price Establishment of minimum Efficiency Requirements for SWHs: Compulsory minimum efficiency requirements will encourage producers of SWH to improve the product efficiency in view to lower the energy consumption at their use.</td>
</tr>
<tr>
<td>Measures and activities with indirect impact on GHG emission reduction</td>
<td>Establishment of a legal and institutional framework to facilitate implementation of the programme Capacity building and raising awareness activities</td>
</tr>
<tr>
<td>NAMA timeframe</td>
<td>To be defined</td>
</tr>
<tr>
<td>- Implementation</td>
<td></td>
</tr>
<tr>
<td>- Operation</td>
<td></td>
</tr>
<tr>
<td>NAMA implementation and operation costs</td>
<td>Full cost of programme establishment</td>
</tr>
<tr>
<td>NAMA type</td>
<td>Supported NAMA (with the possibility of NAMA crediting for parts of the actions)</td>
</tr>
<tr>
<td>Type of support required under the NAMA</td>
<td>Short-term and long-term funding to support the programme Technical, institutional capacity building assistance</td>
</tr>
</tbody>
</table>

**Justification:** The Promotion of solar water heating systems represents a potential NAMA idea for Syria since:

- This measure has a large mitigation potential (predicted total number of houses will be 7.9 million in 2030)
- This type of measure is widely supported by international donors in developing countries
- The Solar water heater technology is very mature and widely spread
• This measure will lower the energy consumption in the household sector contributing hence to the sustainable development of the country

Energy Efficient Building Code
UNDP Syria is currently supporting the Syrian Government to carry out preparatory activities needed for the design of a full scale UNDP/GEF project on Energy efficient Building code in Syria. The proposed NAMA idea is as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Building sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Energy efficiency</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
</tbody>
</table>
| Measures and activities with direct impact on GHG emission reduction | • Development of an energy efficiency building code and construction of new buildings according to the code requirements  
• Measurement of direct and indirect financial savings and GHG emission reductions resulting from the integrated building design and construction |
| Measures and activities with indirect impact on GHG emission reduction | • Prioritize policies and measures  
• Formulate EE Building strategy and investment plan  
• Identify the demo area for the implementation of an integrated building design approach;  
• Identify the roles and responsibilities of all stakeholders for integrated design of the selected buildings  
• Establishment of a legal and institutional framework to facilitate implementation of the programme  
• Capacity building and raising awareness activities |
| NAMA timeframe  
- Implementation  
- Operation | • To be defined |
| NAMA implementation and operation costs | • Full cost of programme establishment |
| NAMA type | • Supported NAMA (with the possibility of NAMA crediting for parts of the actions) |
| Type of support required under the NAMA | • Short-term and long-term funding to support the programme  
• Technical assistance in the code design |

Justification: The Energy efficiency building code is an interesting NAMA idea for Syria since:
• This measure has a large mitigation potential in the residential sector  
• UNDP is currently supporting the Syrian Government to carry out preparatory activities of this programme  
• It is in line with the Syrian strategy in matter of energy efficiency in the household sector  
• This measure will lower the energy consumption in the household sector contributing hence to the sustainable development of the country
Annex 8 - Tunisia

Tunisia submitted a long list of potential carbon reduction actions as NAMA proposals to the UNFCCC Secretariat within the Copenhagen Accord in May 2010. This included measures in the energy (12), transport (6), household (5), industrial (6) and forestry (5) sectors. Major national stakeholders engaged in a process coordinated by the Ministry of the Environment with the support of the CDM/JI Initiative with the aim of analysing promising national initiatives that have high potential to be developed into a NAMA for fast track financing. This consultation process has led to a focus on the waste sector and the renewable energy and energy efficiency sectors and specifically to develop the following as NAMA proposals:

- Tunisian Solar Plan - includes 40 individual renewable energy, energy efficiency and transport measures
- Biowaste Treatment plan - includes a wide range of measures to avoid and use methane from the waste sector, except for landfill gas and MSW which is already included in the Solar Plan and CDM

These were developed as NAMA proposals in cooperation with GTZ. Table 2 on page 9 provides an overview of the two NAMA concepts. For further details of the measures covered under the two NAMAs see [http://www.jiko-bmu.de/files/basisinformationen/application/pdf/nama_proposals_tunisia.pdf](http://www.jiko-bmu.de/files/basisinformationen/application/pdf/nama_proposals_tunisia.pdf).

In its country study on Tunisia, ALCOR screened a range of potential NAMA ideas using the following key criteria for selection:

- GHG mitigation potential
- Abatement cost
- Availability and maturity of technology
- Monitoring, reporting & verification (MRV)
- Links to national strategies and national plan
- Donor attractiveness
- Sustainable Development benefits

Based on these criteria, the two most attractive NAMAs identified for Tunisia were as follows:

### Wind energy development in the industry sector

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Energy Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Electricity generation sector</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>The Government of Tunisia is promoting the development of wind energy in the industrial sector. The regulatory framework has been changed to enhance renewable energy through allowing consumers to produce electricity from wind energy. The Tunisian Solar Plan includes a measure to encourage investment in wind farms for self-consumption of cement industry - 60 MW (measure 4.1). This NAMA would expand on this, doubling the capacity to 120 MW in line with plans announced by the Tunisian Ministry of Industry and Technology (MIT) for self-production and consumption of electricity from wind power by industrial large electricity consumers “EGCElec”. A potential of up to 120 MW power for electricity self-generation by companies large consumers of electricity has already been identified. However, many barriers still prevent the development of this field, especially financial and regulatory constraints. The objective of the NAMA is thus to help the Tunisian government promote the development of wind energy in the industrial sector. The regulatory framework has been changed to enhance renewable energy through allowing consumers to produce electricity from wind energy.</td>
</tr>
</tbody>
</table>
Government mobilizing its wind energy potential in the industry sector by installing 120 MW by 2016. This NAMA would cover the necessary regulatory reforms, facilitation of the projects and subsidizing the selling price of wind power to be supplied to STEG to make the wind projects attractive for the industrial consumers.

**Measures and activities with direct impact on GHG emission reduction**
- Subsidizing the wind power selling price
- Valorisation on the carbon market of the CO₂ emission reduction

**Measures and activities with indirect impact on GHG emission reduction**
- Review of the regulatory framework to enable the self-producers to sell their electricity to other private entities and remove the 30% limit for the supply of produced electricity to STEG
- Assistance to ANME and STEG for the development and the implementation of the MRV system related to the NAMA.

**NAMA timeframe**
- Implementation: 2012-2016
- Operation: 2012-2031

**NAMA implementation and operation costs**
- To be estimated

**NAMA type**
- Supported NAMA (with the possibility of NAMA crediting for parts of the actions)

**Type of support required under the NAMA**
- Financial: Selling price subsidy
- Technical: Assistance for MRV system establishment

**Justification:**
The Wind energy development in the industry sector represents a potential NAMA idea for Tunisia since:
- This measure has a considerable large mitigation potential
- There is a local commitment for the development of this NAMA from private sector and government sides
- This measure is part of the national energy strategy and is directly linked to the national energy conservation programmes in the industrial sector
- There is a local experience of monitoring CDM wind projects that could be widely replicated in case of a national programme
- The wind power technology is mature, widely spread and already deployed in Tunisia
- This measure contributes to the sustainable development of Tunisia through GHG emission reduction, diversifying energy supply, reducing dependency on energy imports, establishment of a technological and industrial partnership with foreign wind technology suppliers…

**Improvement of private building energy performance in Tunisia**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Building Sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Energy efficiency</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>NAMA context and justification</td>
<td>The idea of this NAMA is based on a study conducted years ago by the Tunisian National Agency for Energy Conservation (ANME) in the framework of the thermal regulation project financed by GEF and the French cooperation. The study has shown the highest specific potential for energy conservation in the private sector when insulating the roof of existing buildings and newly self-constructed buildings. Additionally, it was proved that insulating the roof is the most cost-</td>
</tr>
</tbody>
</table>
Mobilizing NAMAs and new carbon market mechanisms in RCREEE Member States post 2012

effective measure for the targeted buildings in Tunisia. The Solar Plan includes insulation of terraced housing with 11 million m² of thermal insulation, which this NAMA would expand on.

The NAMA will consist in rolling-out a large programme for insulating roofs of private houses (new and existing buildings) in Tunisia to reduce the demand of fossil fuel for heating and fossil fuel based power generation for cooling in such premises. The objective is to insulate the roofs of:
- 60,000 buildings by 2015 (7.7 million m²); and
- 270,000 buildings by 2020 (over 34 million m²).

The business model foresees to provide financial support to the initial investment of implementation of technology to the private owner of the house by providing a subsidy per m² of insulated roof combined with a soft loan for the remaining costs.

This programme was previously assessed from a Programmatic CDM (PoA) point of view and it was recommended to develop it as a NAMA due to additionality and methodology risks.

<table>
<thead>
<tr>
<th>Measures and activities with direct impact on GHG emission reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help the consumer to overcome the capital cost barrier by:</td>
</tr>
<tr>
<td>Subsidizing the interest rate of loan</td>
</tr>
<tr>
<td>Provision of an additional investment subsidy to the consumer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures and activities with indirect impact on GHG emission reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity building of operators on quality control of installations</td>
</tr>
<tr>
<td>Equipment of local authorities with relevant facilities for insulation material accreditation</td>
</tr>
<tr>
<td>Assistance to ANME for the development and the implementation of the MRV system related to the NAMA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAMA timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation: 2012-2014</td>
</tr>
<tr>
<td>Operation: 2012-2031</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAMA implementation and operation costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>To be estimated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAMA type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported NAMA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of support required under the NAMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial: Programme establishment, capacity building and potentially soft loans to assist interest rate reduction</td>
</tr>
<tr>
<td>Technical: Assistance for MRV system establishment</td>
</tr>
</tbody>
</table>

Justification: The Improvement of private building energy performance in Tunisia is a potential NAMA idea for Tunisia since:
- This measure has a large mitigation potential estimated at 2.5 MTCO₂-e over the life of the programme
- Existence of a wide network of insulation companies operating in the Tunisian market with a proved experience in operating insulation material installation
- This measure is part of the national energy strategy and is directly linked to the national energy conservation programmes in the building sector
- There is already an interest by an international financial organization for this programme as it was originally conceived under the PoA model
- This measure contributes to the sustainable development of Tunisia through reducing CO2 emissions, mid- to long-term employment of installer companies and other services provider in Tunisia, reducing public subsidies for fossil fuels, awareness rising for energy conservation and environmental friendly
technology among the participants, contributing to poverty alleviation by significantly reducing the expenditure for energy for heating and cooling.

**Other NAMAs opportunities**

Apart from the measures covered by the NAMAs described above, there are a variety of other mitigation actions in the renewable energy and energy efficiency fields in Tunisia that could be considered further for development as NAMAs. Some of the additional measures highlighted in the Tunisian Government’s NAMA submission to the UNFCCC include:

- Electricity sector - generation from biomass (that is, not from the waste sector since this is covered in the Solar Plan and Biowaste Treatment Plan); increasing cogeneration and tri-generation;
- Transport sector - increasing the use of clean energies, especially CNG; promotion of collective transport (metro, train and bus in dedicated lanes) and urban transport plans in cities; improved transport logistics, multimodal transport and rail freight;
- Industry sector - development of energy efficiency contracts in the industrial, transport and tertiary sectors; the reinforcement of the national programme for the environmental upgrading of industrial companies;
- Agriculture and forestry sector – various measures, including reforestation, and increasing biological farming practices.\(^{12}\)

Fully developing NAMA concepts for all of these measures is outside the scope of this report. However, there is a logical connection between the Tunisian cogeneration development PoA recommended for support in the CDM report, the government’s plans to increase cogeneration/tri-generation and the wind self-generation NAMA. If the cogeneration PoA were not able to be successfully registered before the end of 2012, the projects could be combined with the wind self-generation NAMA described above. Alternatively, if the PoA goes ahead, it could be used as the basis for scaling up cogeneration capacity further under the NAMA framework (bottom-up NAMA development).

In a report for ANME in 2010, ALCOR estimated a techno-economic potential of 257 MWe of cogeneration in the industrial sector and 84 MWe in the tertiary sector in Tunisia (“Etude sur le development de la cogeneration et la trigeneration en Tunisie”, 2010). Thus, a combined wind-cogen NAMA for the self-generation of electricity in the industrial and tertiary sectors could encompass:

- Up to 120MW wind self-generation by 2016; and
- Up to 341MWe cogeneration by 2016.

This would require lifting of the restrictions on the sale of electricity to STEG and the introduction of a premium tariff for cogeneration.

The MRV arrangements would be relatively straightforward for the wind power components but potentially more complicated for cogeneration (even more so for trigeneration). Significant technical assistance may be required to design and implement an appropriate framework. As a starting point, the relevant CDM methodologies AM0048 (includes cogeneration projects supplying to multiple customers) and AM0049 (includes cogeneration at an existing industrial facility to meet own electricity and/or steam/heat demand) could be drawn on.

Stakeholders from the National Agency of Waste Management (ANGed) also highlighted the need for a strategic plan for energy recovery from biomass to be fully developed as a NAMA Proposal. The NAMA concept would need to be developed subject to further specification of the scope measures to be included, and clarification of how it relates to measures included in the aforementioned Biowaste Treatment Plan. The potential in Tunisia for utilization of agricultural wastes such as those produced from olive oil production, crop residues and vegetable canneries has already been shown to be significant. The self-generation NAMA concept presented above could also be expanded to incorporate electricity generation from biomass. For example, there are a number of CDM projects currently under development/validation involving utilisation of biomass waste in the industrial sector (see CDM report) – if any of these are not registered by the end of 2012 they could also potentially be incorporated into the industrial sector self-generation NAMA framework.

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\(^{12}\) Due to the EU’s decision not to include credits from such projects post 2012 these measures are not considered further in this report.
Annex 9 - Yemen

Considering the low development of CDM market in Yemen, NAMAs represent an opportunity for the country enabling it to integrate climate into development strategies and to contribute to the achievement of sustainable development programmes based on developed countries cooperation: technology transfer, financial support and capacity buildings.

On the basis of the Ministry of Water and Environment publications and international agencies reports on Yemen, we have screened the main NAMAs ideas in Yemen and selected the potential ones considering the following criteria:

- GHG mitigation potential
- Abatement cost
- Availability and maturity of technology
- Monitoring, reporting & verification (MRV)
- Links to national strategies and national plan
- Donor attractiveness
- Sustainable Development benefits

We have focused our analysis on mitigation measures in sectors which although not covered by the carbon market so far are of great value in global efforts to mitigate climate change.

We think therefore that the following measures could constitute potential NAMA ideas for Yemen:

### Establishment of a Programme for Energy Efficiency Labelling of Electronic Household Appliances

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>Sector</td>
<td>Energy efficiency in building sector</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Electrical appliances</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
</tbody>
</table>
| Measures and activities with direct impact on GHG emission reduction | • Energy labeling of household appliances: Given that the market of household appliances such as washing machines, dishwasher, oven, air-conditioning systems etc. are highly visible to the consumer, the intention is to increase consumer’s awareness on the real energy use of household appliances through a liable and clear labelling in their sales points.  
• Minimum Efficiency Requirements: Compulsory minimum efficiency requirements will encourage producers of household appliances to improve the product design in view to lower the energy consumption at their use. |
| Measures and activities with indirect impact on GHG emission reduction | • Establishment of a legal and institutional framework to facilitate implementation of the programme  
• Acquisition of local energy performance testing facilities  
• Design of labels  
• Capacity building and raising awareness activities |
| NAMA timeframe | To be defined |
| NAMA implementation and operation costs | Full cost of programme establishment |
| NAMA type | Supported NAMA |
| Type of support required under the NAMA | Short-term and long-term funding to support the programme |
Technical support for the selection of the appropriate energy labelling model and the label design

**Justification:** The Energy Efficiency Labelling of Electronic Household Appliances represents a potential NAMA idea for Yemen since:

- This measure has potentially a large mitigation potential as there are no performance and energy efficiency standards or labels for electrical appliances in the country
- This type of measure is widely supported by international donors in developing countries
- The monitoring of the programme is easy as there is no domestic manufacture of appliances which means goods can be tested at the point of entry, which is much easier than at the point of sale
- The technology to be deployed consists in testing facilities which are mature and widely spread
- This measure will lower the energy consumption at the demand side contributing hence to the sustainable development of the country

### Efficient Lighting in Public Buildings

<table>
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<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>Sector</td>
<td>Energy efficiency in public building sector</td>
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<tr>
<td>Sub-sector</td>
<td>Lighting</td>
</tr>
<tr>
<td>NAMA boundary</td>
<td>Entire country</td>
</tr>
<tr>
<td>Measures and activities with direct impact on GHG emission reduction</td>
<td>Promotion of the adoption of CFLs in government buildings</td>
</tr>
<tr>
<td>Measures and activities with indirect impact on GHG emission reduction</td>
<td>Design of the programme</td>
</tr>
<tr>
<td></td>
<td>Establishment of a legal and institutional framework to facilitate implementation of the programme</td>
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<td></td>
<td>Acquisition of high-quality CFLs</td>
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<td></td>
<td>Capacity building and raising awareness activities</td>
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<td>NAMA timeframe</td>
<td>To be defined</td>
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<tr>
<td>- Implementation</td>
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<td>- Operation</td>
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<tr>
<td>NAMA implementation and operation costs</td>
<td>Full cost of programme establishment</td>
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<tr>
<td>NAMA type</td>
<td>Supported NAMA</td>
</tr>
<tr>
<td>Type of support required under the NAMA</td>
<td>Short-term and long-term funding to support the programme</td>
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</table>

**Justification:**
The Efficient Lighting of Public Buildings could be developed as a NAMA for Yemen since:

- Potential estimated at 300,000 lamps in the public sector
- The CFL technology is efficient, mature and widely spread
- This measure is cost-effective and could be easily implemented through instruction at the political level
- This measure will lower the energy consumption at the demand side contributing hence to the sustainable development of the country