Capacity-building to support the readiness for NAMAs in a MRV manner
Outline

1. Background of NAMAs in a MRV manner
2. OECC’s approach to developing NAMAs in a MRV manner under the MOEJ Programme
3. Activities in 4 partner countries

Reference materials
1. Background of NAMAs in a MRV manner
Elements of NAMAs

- Subject to measurement, report, verification (MRV)
  (differentiated MRVs for domestic and international finance)
- Supported by technology, financing, and capacity-building
- Aims (at least) at deviation from business-as-usual emission (BAU) in 2020
- Reported together with GHG Inventory in BUR and described with quantitative goals and progress indicators
- Encouraged to link with low carbon development strategies and planning

1/CP.13, 2/CP.15 Annex, 1/CP.16, and 2/17 and its Annex III (for detail slides 25 and later)

As long as with these elements, NAI Parties can decide NAMAs as they like, (while further elements may be agreed by the COP)
1. Background of NAMAs in a MRV manner

**Illustration of mitigation actions in relation to BAU**

- **BAU Emissions**
  - New Market Mex
  - CDM
  - International support
  - Others

- **Actual Emissions**

- **Domestic efforts**

- Time (Target Year):
  - 20XX
  - 2020
<table>
<thead>
<tr>
<th>Country</th>
<th>Target</th>
<th>Sectors for NAMAs</th>
<th>Reference Level</th>
<th>Relevant Plan/Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhutan</td>
<td>Carbon Neutral (with Sink)</td>
<td>N/A</td>
<td>N/A</td>
<td>-</td>
</tr>
</tbody>
</table>
| China   | 40-50% /GDP | • 15% for the share of non-fossil fuel  
• Forest Coverage 40,000,000 ha | 2005 | China Climate Change Program |
| Indonesia | 26-41% (26% reduction thru unsupported NAMAs) | • Sustainable Peat land  
• Deforestation  
• Forestry, Agriculture  
• Renewable Energy  
• Waste  
• Transport | BAU | National Climate Change Action Plan and other development/sectoral plans |
| Mongolia | N/A | • Renewable Energy  
• Construction, Industry  
• Transport  
• Agriculture, forestry | N/A | - |
1. Background of NAMAs in a MRV manner

**NAMA Response by NAI Parties to UNFCCC (example)**

Wide sector coverage (No. of countries):

- Energy production: 34
- Forestry: 31
- Transport: 28
- Buildings/residential: 24
- Industry: 19
- Waste/waste water: 18
- Agriculture: 15
- Not defined: 13

*Data might be slightly different to other studies due to vague expressions in Submissions.
**For the same reason graphs might not reflect exactly the current position of the Parties.

Source: Compilation of information on NAMAs (FCCC/AWGLCA/2011/INF.1)
1. Background of NAMAs in a MRV manner

NAMA Response by NAI Parties to UNFCCC (example)

Broad range of type of action (No. of countries):

- Specific action or project: 27
- Laws, Policies and measures: 23
- Strategy development, programmes and plans: 23

Source: Compilation of information on NAMAs (FCCC/AWGLCA/2011/INF.1)
The Website Platform that contains information on NAMAs submitted to UNFCCC

http://www.mmechanisms.org/e/namainfo/index.html
2. OECC’s approach to developing NAMAs in a MRV manner under the MOEJ Programme
2. OECC’s approach to developing NAMAs in a MRV manner

Distinctive Feature of OECC’s approach for FY2012 Activities

• Bottom up approach, aggregating mitigation activities with quantified GHG emission reduction (BAU and NAMAs)
• Based on existing and future policies on sectors for identifying activities of emission sources and reduction
• GHG quantification are basically based on equations of the IPCC GHG Inventory Guidelines
• Considers MRV both at activity level and aggregated level
• Utilizes existing domestic reporting systems as much as possible
• Highlights technology aspects in a selected sector for NAMAs

Japan’s domestic experience of the Target Achievement Plan, utilizing P-D-C-A Cycle
Quantifying GHG Emissions Reduction

Climate Change Sectoral Strategy

Cambodia Energy Sector Strategy

Others

*Extract data and make fact sheets

Activity 1: Data and Info. collection

Activity 2: GHG Emissions Calculation

Activity 3: Identify Mitigation Action
- XX MW Solar
- XX units Boilers

Fig 1. Energy Development Plan in BAU and NAMAs

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAU</td>
<td>XXX MWh</td>
<td>X,XXX MWh</td>
</tr>
<tr>
<td>NAMAs</td>
<td>-</td>
<td>X,XXX MWh</td>
</tr>
</tbody>
</table>

Fig 2. GHG Emissions in BAU and NAMAs

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAU</td>
<td>XXX t/CO2</td>
<td>X,XXX t/CO2</td>
</tr>
<tr>
<td>NAMAs</td>
<td>-</td>
<td>X,XXX t/CO2</td>
</tr>
</tbody>
</table>
Proposed Steps for NAMA Development

(1) Collection of Info on relevant policies and strategies
Collect and analyze relevant policy documents of development, climate change and related sector

(2) Collection data for BAU in the sector
Collect data for calculating BAU emission with bottom-up approach (e.g. List all individual landfills, and collect respective waste volumes in the waste sector)

(3) Quantification GHG emissions of BAU
Quantify GHG emissions based on (2) data, and
a) Identify the calculation formulas
b) Calculate respective emission in BAU
c) Aggregate respective emissions

(4) Examination and selection of NAMAs options
Select possible NAMAs options and technologies based on (1) policies and mitigation strategies and additional consideration.

(5) Quantification GHG emission reduction by NAMAs
Quantify GHG emissions with (4) NAMAs assumptions
a) Set the calculation formulas
b) Calculation
c) Aggregate potential with reduction by NAMAs

Low-carbon technology survey
Examination MRV methods
Capacity-buildings in Vietnam for NAMAs implication

Source: OECC 2012
BAU: Energy Demand Projection in County A

High case (GDP Growth Rate: 6%)
Based case (5%)
Low case (3%)

Source: OECC (Overseas Environmental Cooperation Center, Japan) 2012
**BAU: Power Development Plan in Cambodia**

*Need to consider projects which may be developed in BAU out of the present plan.*

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Name</th>
<th>Type</th>
<th>Capacity (MW)</th>
<th>Year</th>
<th>Condition as of Dec. 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>XXXX</td>
<td>Heavy Fuel Oil</td>
<td>340</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>YYYY</td>
<td>Coal</td>
<td>13</td>
<td>-</td>
<td>Operating</td>
</tr>
<tr>
<td>3</td>
<td>ZZZZ</td>
<td>Hydro</td>
<td>13</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>AAAA</td>
<td>Wood, Biomass</td>
<td>6</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Kamchay</td>
<td>Hydro</td>
<td>194</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kirirom III</td>
<td>Hydro</td>
<td>18</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Stung Atay</td>
<td>Hydro</td>
<td>120</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Stung Tatay</td>
<td>Hydro</td>
<td>246</td>
<td>2013</td>
<td>Under Construction</td>
</tr>
<tr>
<td>9</td>
<td>Lower Stung Russei Churum</td>
<td>Hydro</td>
<td>338</td>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>100 MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>100</td>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>270 MW Phase 1 of the 700MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>270</td>
<td>2014~2015</td>
<td>PPA signed</td>
</tr>
<tr>
<td>12</td>
<td>100 MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>100</td>
<td>2016</td>
<td>PPA signed</td>
</tr>
<tr>
<td>13</td>
<td>430 MW Phase 2 of the 700MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>430</td>
<td>2017</td>
<td>FS completed</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>Coal</td>
<td>α*</td>
<td>20XX</td>
<td>May be developed*</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>2188+α</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: OECC 2012*
# Power Development Plan with mitigation options

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Name</th>
<th>Type</th>
<th>Capacity (MW)</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>XXXX</td>
<td>Heavy Fuel Oil</td>
<td>340</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>YYYY</td>
<td>Coal</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>ZZZZ</td>
<td>Hydro</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>AAAAA</td>
<td>Wood, Biomass</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Kamchay</td>
<td>Hydro</td>
<td>194</td>
<td>2012</td>
</tr>
<tr>
<td>6</td>
<td>Kirirom III</td>
<td>Hydro</td>
<td>18</td>
<td>2012</td>
</tr>
<tr>
<td>7</td>
<td>Stung Atay</td>
<td>Hydro</td>
<td>120</td>
<td>2012</td>
</tr>
<tr>
<td>8</td>
<td>Stung Tatay</td>
<td>Hydro</td>
<td>246</td>
<td>2013</td>
</tr>
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<td>9</td>
<td>Lower Stung Russei Churum</td>
<td>Hydro</td>
<td>338</td>
<td>2013</td>
</tr>
<tr>
<td>10</td>
<td>100 MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>100</td>
<td>2013</td>
</tr>
<tr>
<td>11</td>
<td>270 MW Phase 1 of the 700MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>270</td>
<td>2014 ~2015</td>
</tr>
<tr>
<td>12</td>
<td>100 MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>100</td>
<td>2016</td>
</tr>
<tr>
<td>13</td>
<td>430 MW Phase 2 of the 700MW Coal Fired Power Plant</td>
<td>Coal</td>
<td>430</td>
<td>2017</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>Coal</td>
<td>α*</td>
<td>20XX</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>2188+α</td>
<td></td>
</tr>
</tbody>
</table>

Source: OECC 2012

- **Promotion of renewable energy (hydro, solar, biomass**
- **Introduction of high-performance boiler**
**GHG Emissions Reduction with mitigation measure**

*All values are calculated on the assumption.*

<table>
<thead>
<tr>
<th>Mitigation measure</th>
<th>Calculation method</th>
<th>Emissions reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction of high-performance boiler</td>
<td>Amount of energy conserved by high-performance boilers (50 kl oil-equivalent/unit) × Cumulative numbers of boilers introduced in target year 2020 (100 units) × Emission factor (2.62 tCO2/kl)</td>
<td>13,100 t-CO2</td>
</tr>
<tr>
<td>Promotion of renewable energy</td>
<td>The use of renewable energy in 2020 (1,000,000 MWh) × Grid emission factor (0.6257 t-CO2/MWh)</td>
<td>625,700 t-CO2</td>
</tr>
</tbody>
</table>

Source: OECC 2012
Secretariat of the Committee (MEGD)

Mongolia NAMA committee (verification at macro level)

Possible Verification at macro level

- Assessment of Plan
- Verification of the progress report
- Review of aggregated GHG emission reduction
- Assessment of challenges and further needs (PDCA cycle)
- Submission and Report to UNFCCC

Ministries and institutions in charge

Ministry of Energy | MEGD | Ministry

Implementation and verification at micro level* (ER from individual projects)

Verification varies by different financial schemes

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-market</td>
<td>Regular monitoring and data collection procedure (such as that of energy regulatory committee's)</td>
</tr>
<tr>
<td>JCM/BOCM</td>
<td>JCM meth, third party verification</td>
</tr>
<tr>
<td>CDM</td>
<td>CDM meth, monitoring, DOE verification</td>
</tr>
</tbody>
</table>

* For a policy measures not as a project-based (such as taxation policy, etc) may be MRVed at the macro level but still need to have some ways for QA/QC of collected data within its programme.
3. Activities in 4 partner countries
Selected Sector: Energy Supply Sector
NAMAs: Improvement of CHP Plants
Working Group: MEDG, Ministry of Energy, other key institutes and experts, chaired by Climate Change Special Envoy

Results:
- Calculated BAU and ER by NAMAs ex ante both for power and heat supplies for CHP3 and CHP4
- Sorted out reporting process of activity data (ie Energy Regulatory Committee)
- Discussed technology options for application in NAMAs, including process diagnosis in CHP
Selected Sector: Transport Sector
NAMAs: Replacement of conventional vehicle with EV
Working Group: 7 Ministries participates, including MONRE, MPWT, MIME, MOIC, MOST, chaired by Results:

- Calculated BAU and ER by NAMAs ex ante
- Activity data (fuel economy data) originally collected and based on JICA Study
- Proposed institutional arrangements are planned to be a part of technical WG under the National Climate Change Committee

<table>
<thead>
<tr>
<th></th>
<th>Motorcycle</th>
<th>Passenger car</th>
<th>Paratransit/Minibus</th>
<th>Large Bus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Emissions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline fuel economy (km/liter)</td>
<td>40</td>
<td>13</td>
<td>8</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>Driving distance (km/day)</td>
<td>16</td>
<td>25</td>
<td>100</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>CO₂ emission factor (kgCO₂/liter)</td>
<td>2.32</td>
<td>2.32</td>
<td>2.58</td>
<td>2.58</td>
<td></td>
</tr>
<tr>
<td>Days per year</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>Baseline emission (tCO₂/year/vehicle)</td>
<td>0.3</td>
<td>1.6</td>
<td>15.7</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td><strong>Project Emissions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driving distance (km/day)</td>
<td>16</td>
<td>25</td>
<td>100</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Project electricity economy (kWh/km)</td>
<td>0.006</td>
<td>0.110</td>
<td>0.124</td>
<td>0.125</td>
<td></td>
</tr>
<tr>
<td>Grid electricity emission factor (tCO₂/MWh)</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Days per year</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>Project emission (tCO₂/year/vehicle)</td>
<td>0.0</td>
<td>0.1</td>
<td>0.5</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Emission reduction (tCO₂/year/vehicle)</td>
<td>0.3</td>
<td>1.5</td>
<td>15.2</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td><strong>Number of EV</strong></td>
<td>697500</td>
<td>45000</td>
<td>12800</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td><strong>Total Emission Reduction (tCO₂/year)</strong></td>
<td>233,813</td>
<td>68,764</td>
<td>195,103</td>
<td>3,025</td>
<td>500,705</td>
</tr>
</tbody>
</table>

Source: Basic Data Collection Study on Low-emission Public Transport System in Lao PDR, JICA, modified by OECC
Viet Nam

Selected Sector: Waste Sector
NAMAs: National Biodigester Programme
Working Group: MONREE, MOC, MPI, VEA, IMHEN, chaired by IMHEN

Results:

• Calculated BAU and reduction by NAMA candidates (Emission Reductions from Methane Emission from LFs)
• Collected activity data from all landfills in Viet Nam
• Discussed possible reporting procedures
• Jointly reported at COP18 Side Event

Image of CH4 mitigation while realizing 3R (reuse, reduce, and recycle) society

http://www.mmechanisms.org/event/details_121126 COP18sideevent.html
Selected Sector: Agricultural Sector
NAMAs: National Biodigester Programme
Working Group: MOE, MPWT, MIME chaired by MOE DG

Results:

- Calculated BAU and ER by NAMAs ex ante (Emission Reductions from Methane Reduction and NRB)
- Sorted out reporting procedure

CH4 Emission from animal manure and its Reduction by biodigester Programme

CO2 reduction from non renewable biomass by different fuels
Thank you very much!
Reference materials
**Bali Action Plan (1/CP.13)**

1.b.(ii) **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;

**Copenhagen Accord (2/CP.15 Annex)**

5. Mitigation actions(..)including national inventory reports, shall be communicated through national communications(..)every two years (.). **Mitigation actions taken by Non-Annex I Parties** will be subject to their *domestic measurement, reporting and verification* the result of which will be reported through their national communications(..). **Nationally appropriate mitigation actions seeking international support** will be recorded in a registry along with relevant technology, finance and capacity building support. (...and) will be subject to international **MRV** measurement, reporting and verification(...)
8. **Scaled up, new and additional, predictable and adequate funding as well as improved access shall be provided to developing countries,** ...... The collective commitment by developed countries is to provide new and additional resources, including forestry and investments through international institutions, approaching **USD 30 billion for the period 2010–2012** with balanced allocation between adaptation and mitigation. ...... [D]eveloped countries commit to a goal of mobilizing jointly **USD 100 billion dollars a year by 2020** to address the needs of developing countries........A significant portion of such funding should flow through the Copenhagen Green Climate Fund.
CANCUN AGREEMENT (1/CP.16)

48. Agrees that developing country Parties will take NAMAs (..), aimed at achieving a deviation in emissions relative to ‘business as usual’ emissions in 2020;

50. Invites developing countries (..) to voluntarily inform the COP of their intention to implement NAMAs (..) to the secretariat;

61. Decides that internationally supported NAMAs will be MRV-ed, and will be subject to international MRV accordance with guidelines to be developed under the Convention;

62. Decides that domestically supported mitigation actions will be MRV-ed domestically in accordance with general guidelines to be developed under the Convention;

64. Decides that information (in BUR..) should include the national GHG inventory report, information on mitigation actions, including a description, analysis of the impacts and associated methodologies and assumptions, progress in implementation and information on domestic MRV, (..);

65. Encourages developing countries to develop low-carbon development strategies or plans in the context of sustainable development;
**DURBAN OUTCOME(2/CP.17)**

32. **Encourages** developing country Parties who are yet to submit information on NAMAs to do so;

34. **Invites** developing country Parties (..) to submit (..) more information relating to NAMAs, including underlying assumptions and methodologies, sectors and gases covered, global warming potential values used, support needs for implementation of NAMAs outcomes;

35. **Invites** developing country Parties to submit this information (..) by 5 March 2012 (..);

38. **Encourages** developing country Parties to develop low-emission development strategies, recognizing the need for financial and technical support (..) for the formulation of these strategies, (..);
Biennial Updated Report (BUR)

39. **Adopts the guidelines**, for the preparation of biennial update reports by non-Annex I Parties,

40. **Affirms that** *the Guidelines shall respect the diversity of mitigation actions* and provide flexibility for non-Annex I Parties to report information, while providing an understanding of actions taken;

41. **Decides:**

   (a) That non-Annex I Parties, *should submit their first biennial update report by December 2014*;

   (f) That non-Annex I Parties shall *submit a biennial update report every two years*, either as a summary of parts of their national communication in the year when national communication is submitted or as a stand-alone update report;
**DURBAN OUTCOME(2/CP.17) ANNEX III**

UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention

I. Objectives

II. Scope

III. National greenhouse gas inventory (page 40)

IV. Mitigation actions (page 41)

11. Non-Annex I Parties should provide information, in a tabular format, on actions to mitigate climate change, by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.

12. For each mitigation action or groups of mitigation actions including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information to the extent possible:

   (a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), **quantitative goals and progress indicators**;