Options and methodologies for developing baselines

Regional workshop on Nationally Appropriate Mitigation Actions
1 - 3 October 2014

Vintura Silva
Team Lead, RCC Kampala
Objectives

**Baselines an Introduction**

**Steps for Baselines**

**Approaches to Baseline Setting**

**RCC Support**
Objectives

Baselines an Introduction
WHAT IS A BASE LINE?

WHY WE NEED BASELINES FOR NAMAS?
Baseline scenario may intended to be a “business as usual” projection, or can represent other scenarios referring to emission reduction targets and be based on different assumptions or conditions.
Baseline scenario:

A scenario that describes future greenhouse-gas emissions levels in the absence of future, additional mitigation efforts and policies. The term is often used interchangeably with business-as-usual scenario and reference scenario.
Transparency

National and international credibility regarding the baseline are acknowledged as key concerns.

- **Nationally**, credibility ensures **credible national policy planning**
- **Internationally**, credibility ensures **acknowledgement for mitigation pledge and efforts**.

*Source: Danish Energy Agency 2014*
WHAT? Baseline

Baselines take into account all UNFCCC gases (CO2, CH4, N2O, SF6, PFCs, HFCs +, NF3) and use the GWP established by the IPCC.

Depending on its purpose and the scope of information used for its development, a baseline can be defined on a project, sectoral, policy, sub national, inter sectoral or national level.

There are no international requirements nor internationally recognized guidelines for the construction of a baseline.

Methodology to be chosen based on the desired level of detail, availability of data and technical expertise. (for internationally supported ??)
Efficiency Measures in the Mexican Residential Building Sector

*Source: Point Carbon/perspectives 2010*
WHY? Baseline

• Estimate emission levels and mitigation potential in a Sector or area

• Prioritize a NAMA based on Potential for mitigation

• For support organizations (finance, technology, capacity building) to get an idea of impact
Objectives

Steps for Baselines
HOW? Baseline

Step 1: Identify the appropriate Baseline approach/es for the NAMA

Step 2: Define the coverage, scope, and time period of the baseline

Step 3: Identify the data requirements based on level of accuracy

Step 4: Identify appropriate metrics for quantifying baseline GHG emissions

Step 5: Investigate the data availability and data collection plans

Step 6: Collect the data and develop the baseline

Step 7: Conduct QA/QC assessments

Step 7: Revision of the baseline
Some of the challenges with data collection

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult to find data sources</td>
<td>Not easily available online, need on the ground contacts, data may be split between different ministries (e.g. biomass data may be located in both Ministry of Energy and Ministry of Forestry)</td>
</tr>
<tr>
<td>Data is often inconsistent</td>
<td>Kilogram per person consumption of wood may be different in every different report</td>
</tr>
<tr>
<td>Data is often out of date</td>
<td>Forestry reports in many countries are often from 10 – 15 years ago</td>
</tr>
<tr>
<td>Data is often available at an aggregated level inappropriate for the SB</td>
<td>Charcoal and wood consumption may be very different in different regions such as urban vs rural areas or wet vs dry regions</td>
</tr>
<tr>
<td>Industrial sector data is often highly confidential</td>
<td>Cement or iron &amp; steel data is not easily accessible</td>
</tr>
<tr>
<td>Minimum services level</td>
<td>Difficulty to determine appropriate level</td>
</tr>
</tbody>
</table>

*Source: Perspectives 2013*
Objectives

Approaches to Baseline Setting
**Approaches to Baseline setting**

**Status quo** Simply drawing a flat line from existing historical emissions

**Control group method** – benchmark of use patterns and energy performance of technologies - is very country specific
Dynamic baselines to accommodate fast moving changes in technologies that could potentially save energy and should be factored into MRV. The failure to build these changes into baselines will lead to significant overestimates in emissions.

Futuristic emission assumed continuation of historical emissions (project i.e same level as before without linking to intensity, emission profile of historic trend); continued rate of growth of emissions / emissions intensity (sector based on GDP to that of the emissions, hypothetical); modeling based on policies (current and expected policies) included in the baseline.

Rebound effects. Rebounds occur when energy efficient improvements in technologies result in greater usage rate, effectively offsetting emission reductions. This is likely to accompany shifts to more consumer oriented lifestyles. (A ton save is not saved but used elsewhere)
The baseline for a CDM project activity

The baseline for a CDM project activity is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity (3/CMP.1, Annex, paragraph 44)

**Standardised Baselines in development**

1. Charcoal production
2. Grid connected energy
3. Rural electrification
4. Charcoal production
5. Cook stove sector (institutional/Household)
6. Forestry Sector
7. Solid waste (LFG)
8. Liquid waste (industrial effluent)
9. Cement (Clinker Production)
10. Waste water
11. Transport
   - Fraction of non-renewable biomass (fNRB)
   - GEF calculations
Baseline Metrics

- Baseline metrics to comprise of a set of indicators (observed in a reference year and measurable in coming years)
- Tracking the indicators overtime indicates the progress and helps to estimate impact on GHG emissions
- Flexibility in the choice of indicators of baseline metrics
Kazakhstan’s Urban NAMAs are defined as the appropriate municipal institutional and financial framework and investment, which will enable Kazakh cities to set-up, reach and monitor their city-wide emission reduction targets, as part of national commitment to reduce Kazakhstan’s emission by 15% below 1990 emissions.

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Proposed indicators of progress*</th>
</tr>
</thead>
<tbody>
<tr>
<td>• National and sectoral inventories and GHG emission targets</td>
<td>• City-wide GHG emission targets and inventories for 15 main cities</td>
</tr>
<tr>
<td>• Establishment and capacity building of Municipal Management Companies (MMCs), business planning and development of investment portfolio</td>
<td>• Capacity building of MMCs to identify and implement low-carbon projects, preparation of bankable emission reduction projects</td>
</tr>
<tr>
<td>• Establishment and capitalization of NFUM</td>
<td>• Additional funding window within NFUM specifically for emission reduction projects prioritized in urban NAMAs</td>
</tr>
<tr>
<td>• Complex modernization of district “Prigorodonoye” in the capital of Astana</td>
<td>• Implementation of additional measures to reduce district emissions by 50% below baseline requirements under NMP</td>
</tr>
</tbody>
</table>
| • ETS covering large industrial emitters, national registry and MRV     | • Registry and MRV for urban NAMAs  
• Rules and regulations providing for “linking” credited urban NAMAs and domestic ETS  
• Signed ERPA between ETS entities and municipalities |

*Source: GEF supported NAMAs/TERI*
GHG emissions inventory as a baseline for absolute reductions

- comparison of reference year inventory with target year inventory
- actions are not measured but the result (GHG emissions reductions)
- existing experience of preparing inventories for National communications

*Source: TERI 2014*
Reference Case Approach

• According to IPCC AR 4, “business-as-usual” baseline/reference case assumes that future development trends follow those of the past and no changes in policies will take place
• Impact on GHG emissions is equivalent to deviations from the reference case
• Defining reference case projecting a probable emission trajectory by selecting an appropriate model for economy (set of policies and barriers; set of assumptions for future development and growth)

A key issue when constructing baseline scenarios is whether or not to include the effects of pre-existing or planned emissions abatement policy in the baseline, their economic lifetime, macroeconomic and socio-demographic indicators, policy implications
Reference Case Approach

Reference Case Approach

*Source: TERI 2014*
**Overall goal:** Development of a low carbon urban transport system

**Specific activities:**
1. Development of efficient public modes of transport like BRTS
2. Development of infrastructure for Non-motorized vehicles
3. Change in Fuel use: electric vehicles, natural gas, bio-fuel
4. Switching to efficient technology for motorized vehicles
5. Retrofitting XYZ rail system with more efficient XYZ technology
6. Conducting awareness-raising campaigns to promote low carbon urban transport

**Key Characteristics:**
- a) Overall sectoral goal: directional and non-quantifiable
- b) List of specific policies, programs and projects (mix of directional, quantifiable) contribute to the overall sectoral goal
- c) Many activities lead to indirect GHG benefits, sectoral GHG inventory might not be suitable
- d) Combination of approaches could be used
- e) Baseline metrics approach for activity 1,2,3,4,6
  - %age of urban population using BRTS/NMV for work trips
  - Current foot fall in existing city rail system/BRTS
  - Fuel mix composition
  - Qualitative: policy for technology standards for MVs
- f) Project approach for 5

*Source: TERI 2014*
GHG emissions from SMW (Gg CO$_2$e) – Total in Peru and per groups of cities (final disposal and biological treatment)

*Source: Axel Michaelowa 2014*
Curva de costos de reducción

Borrador de la curva de reducción (MAC Curve) para el sector de RSM en Perú, 2015-2030

*Source: Axel Michaelowa 2014*
Costs for emission reductions for Solid Waste Management sector, 2015-2030

Draft Marginal Abatement Cost (MAC) Curve of the Solid Municipal Waste (SMW) sector in Peru, from 2015 to 2030

1.1. Capture and flaring of landfill gas (LFG) with electricity generation
1.2. Capture and flaring of landfill gas (LFG) with electricity generation
1.3. Capture and flaring of landfill gas (LFG) with LFG purification and delivery to third parties
2. Waste Composting
3. Mechanical Biological Treatment (MBT)
4. Bio-digesters
5. Recycling
6. Waste to Energy
7. Semi-aerobic landfill
8. Methane Oxidation Cover

Mitigation potential (tCO2e)
Objectives

RCC Support
Support in developing Baselines

- Top down development of three SBs by UNFCCC and to process about eleven submissions from RCC supported regions.
- At secretariat level DNA Help Desk is providing targeted DNAs advice
- RCC Kampala and Lome is in the process of supporting development and approval of baselines in:
  - GEF
  - Rural Electrification
  - Forestry
  - Cook stove
  - fNRB
  - Methane destruction from LFG and Waste water
  - Charcoal Production
  - Clinker production
  - Transport
Thank you for your attention

**CDM Regional Collaboration Centre**

A collaboration between the UNFCCC Climate Change Secretariat and the East African Development Bank

rcckampala@unfccc.int

EADB Offices, No. 4, Nile Avenue

P.O. Box 7128, Kampala, Uganda

Phone: +256 (0) 312517814