# Summary report of
# Urban Methodologies for the Built Environment Workshop
### UNFCCC Headquarters
### 27-28 March 2014

## Day 1

### Welcome and Introduction

Dr. Massamba Thioye, Manager of the UNFCCC Standard Setting Unit, opened the workshop. He first highlighted the large potential for climate change mitigation in the built environment, considering the fact that 2/3 of the energy generated is consumed in cities. However, he also pointed out that such a large potential, that could be achieved at low cost, has not been realized so far, largely due to the difficulty in accounting including for those aspects related to human behavior changes, i.e. it is challenging to quantify emission reductions from the cities/buildings and its standardization. He welcomed and thanked UNEP and other organizations for making this event happen.

Following Dr. Thioye's opening, Mr. Curt Garrigan chaired the next session and made a brief introduction of the UNEP Sustainable Buildings and Climate Initiative (UNEP-SBCI). He highlighted the Common Carbon Metric (CCM) developed by UNEP-SBCI and introduced their work regarding how to operationalize the CCM, including in the *Development of NAMAs for the Building Sector in Asia* project, and UNEP's broader work on assisting cities to assess their policy framework.

### Session 1- Existing Mechanisms for Buildings and Applications (CDM, NAMA)

In this session, Dr. Gajanana Hegde (Team Lead, Standard Setting Unit) from the UNFCCC gave an overview of the recent work under the CDM with a focus on the progress relevant to the buildings sector. He first introduced the latest CMP and EB decisions and then gave an overview of the methodological framework directly related to the measures/technologies of buildings energy efficiency measures, transport and the waste sector. The status of Programme of Activities (PoAs) standards and procedures was briefed, followed by a brief description of the ongoing work on simplification of the underlying procedures/guidelines (e.g. combination of multiple technologies and simplified additionality), which would facilitate project development in the building sector.

Mr. Claudio Forner (Team Lead, Mitigation Data Analysis program) from UNFCCC presented an overview of NAMAs and NAMA registry. He first gave a brief history of where NAMA came from and what NAMA could look like, with an illustrative example from Mexico. He introduced the two avenues for the work under NAMAs: the political process, and the registry process. He then gave an overview of the 57 Party-submitted NAMAs, which represent 37.5% of the Non-annex I countries under UNFCCC. He highlighted that most of the submitted NAMAs are proposed for receiving funds for implementation, and they are mostly related to a mixture of renewable energy and energy efficiency measures. Specifically, 7 NAMAs are related to residential buildings in the

area of heating and lighting. He also introduced the key elements of making bankable NAMAs. He then ended the presentation with a brief introduction of the MRV challenges faced by NAMAs, as well as the process of assessing the Biennial Update Reports submitted from countries.

**Session 2- Practitioner's perspectives**

Mr. Tobias Zeller, Project Advisor from GIZ shared their experience in the vertical NAMA (V-NAMA) project. The aim of the V-NAMA project is to strengthen sub-national involvement in NAMAs. GIZ has initiated V-NAMA projects in South Africa, Indonesia and Vietnam. In particular, he shared their V-NAMA program in South Africa, which aims to reduce 34% emissions by 2020. A tool has been developed by GIZ (i.e. GIZ NAMA Tool) for V-NAMA development:

(a) Step 1 & 2: Identification of framework condition/mitigation opportunities and potential co-benefits;
(b) Step 3: Select NAMA idea. In the case of South Africa, public buildings in provincial and municipal levels are selected;
(c) Step 4: Specify NAMA objectives and select mix of instruments;
(d) Step 5-8: Baseline, MRV plan, detailed NAMA planning, resource identification;
(e) Step 9-10, implementation of NAMA.

The lessons learned also shared by him:

(a) A well-structured step-by-step approach is very helpful;
(b) Do not be afraid of length preparation;
(c) Vertical integration is crucial for the operationalization of NAMA;
(d) Simple MRV.

Mr. Steve Thorne from SouthSouthNorth in South Africa shared their experience in carbon accounting for thermal performance improvement in low-income dwelling structures. First he reviewed relevant policy history from 1980 to 2011 in South Africa. Then he introduced how they had implemented their thermal performance improvement (i.e. insulated ceiling) project activity, including the tools applied (i.e. DesignBuilder, Energy Plus promoted by US department of energy and BESTEST), how service levels (i.e. thermal comfort) and suppressed demand are considered, and the processes they followed to calculate emissions. At the end of his presentation, he highlighted a summary of issues identified in implementing their building projects in South Africa:

(a) The determination of thermal comfort and adaptive thermal comfort, i.e. minimum service levels;
(b) Quality predictive tools;
(c) Monitoring for model calibration is costly, thus public funds for regional calibrations may be required;
(d) How to deal with suppressed demand;
(e) Roles of expert institutions;

(f) Roles of validator and verifier.

**Session 3- Methodologies for Buildings**

Mr. Thioye opened the afternoon session by pointing out that it is necessary to provide more standardization to meet stakeholders' expectations, including inter alia, standardized baseline, PoA and default values. This is to shift the complexity and cost upfront to the regulatory body. He also suggested that the existing methodologies were specifically designed for technologies, whereas future development could be "modules", like transportation module, building module, waste handling module, etc. The methodology will be the various combinations of these modules.

Mr. Niclas Svenningsen from UNFCCC shared the markets and mechanisms developments within and outside the UNFCCC process. The presentation focused on three aspects: CDM, carbon market and the international negotiation.

(a) Starting with the history of CDM/JI, he showed the current achievements of the CDM. With more than 7450 projects and 245 multi-project programmes registered, the projections of CERs generation will touch 8 billion by 2020. However at the same time, there are no sufficient ambitions at this point in time.

(b) The supply/demand imbalance creates difficult situations. The mechanism works, the markets do not (currently). Nevertheless, the market mechanism is not disappearing because it contributes not only to mitigate climate change, but also to sustainable development, technology transfer and other development objectives. More importantly, it is the only way that empowers the private sector to participant in the international collaboration for climate change.

(c) He then introduced the progress of negotiation. It was recapped that at the adoption of the Kyoto Protocol (KP), only 15% of the global emissions was covered, then increased to 85% (voluntary) in Cancun, and reached 100% (universal participation) in Durban. It is expected that a deal will be reached in Paris 2015 for significant reduction commitments. CDM will continue until 2020 and beyond in some way. There is uncertainty regarding JI. The new market mechanism is not clear and is non-existent currently. But, all of them are likely to fall under the Framework of Various Approaches, which means each country can run its own system but under a certain common understanding. The Q&A discussions were focused on how the MRV in CDM can be transferred to NAMA.

Ms. Victoria Novikova from UNFCCC presented the current approaches to baseline setting and MRV under CDM. She provided a statistic showing that there are 24 approved CDM methodologies for building sectors, including whole building design, lighting, cook stove, etc. The methodological approaches for building sectors are: survey and benchmarking, modeling, standardized default value. Some key requirements from

the methodologies were introduced and she ended the presentation by pointing out that methodologies are improved taking into account input from the projects submitted. The Q&A focused on the determination of setting/values in the methodologies, the difficulty of data availability, modeling and calibration of models.

Mr. Perumal Arumugam from the UNFCCC presented the key aspects of NAMA, including its types, planning, design, implementation cycle. In particular, he discussed what could potentially be a better MRV for the building sector:

(a) To consider a dynamic baseline to accommodate fast moving changes in technologies that could potentially save energy and should be factored into MRV;
(b) To consider rebound effects, which occur when energy efficiency improvements in technologies result in a greater usage rate;
(c) To achieve co-benefits in the local development (cleaner air and improved public health) attributable to energy efficiency reforms than GHG reduction; and
(d) To consider lifecycle emissions, which is increasingly important for infrastructure investments to trace emissions from extraction of raw materials to the end of the lifetime of the building. However, he also agreed that factoring each of these considerations adds greater complexity to the MRV.

**Session 4- Methodologies for Buildings (continued)**

Mr. Kishor Rajhansa (Team Lead , Standardised Baseline) from UNFCCC presented the approach for Standardized Baseline (SB) in buildings. He first introduced the procedure for submitting SBs, by using the sectoral template or developing a new template. He explained the differences between the CDM methodologies/tools and standardized baselines: compared with CDM methodologies as international standards, the SBs can be sectoral, regional, national or international, and the SBs can be measure-specific and used in conjunctions with methodologies/tools. The concept of SB was also explained through an example of the cement sector. It is emphasized that the SB is valid for 3 years and should be updated by the DNA every three years. In the context of applying a SB to building sectors, several issues were listed for further discussion:

- How sectoral “output/service” can be defined and data on penetration of output can be collected (possibly floor occupied?);
- How performance can be defined and compared (kWh/sq ft?)
- How aggregation levels can be defined? Types of buildings and income levels? Is city-wide aggregation more relevant?
- How modeling can be used at data collection level?
- How one can identify the country-specific thresholds by collecting data on penetration?
- How technologies can be defined for “technology switch measure”? Or building-wide emission factor is more relevant? Probably yes.

- How the data on cost of technologies and barriers can be collected (if used for demonstration of additionality)?

Finally, he highlighted the characteristics perceived for NMMs are engrained in SBs. The QA/QC guidelines can also be used for NAMAs and are easy to use for sectoral crediting.

## Day 2

**Session 4- Methodologies for Buildings (continued)**

Professor Rajat Gupta from Oxford Brookes University gave a presentation on:

(a) Performance gap and MRV methodology;
(b) MRV and Common Carbon Metric.

He pointed out that "to understand energy use in buildings is a problem," because it is a complex social system. Technologically, there are considerable differences between the simulation and measurement. He presented studies on residential buildings in UK, which reveal that compared to the design, the energy consumption through measurement is generally much higher (2-5 times) than the computer simulation projection at the design stage. The study investigator tried to understand the reasons and conjectured that it is generally due to the quality of construction, behavior of the occupants, special uses of buildings, etc. Even after the correction/calibration of the simulation models, the actual energy consumptions are also higher. Therefore, it becomes crucial when developing the MRV methodology to avoid 'virtual carbon' (emission reduction estimates based on simulation). However, he also emphasized that due to the complexity of building energy use, the ways to conduct MRV is to keep it simple, but still, the performance gap should not be ignored. The possible solutions maybe: transparency and accountability, on-going monitoring, refine simulation models, and to have an international building performance database.

Mr. Gupta then introduced the Common Carbon Metric (CCM): a tool designed by UNEP-SBCI. The CCM is a tool to help the users (organizations, building owners and managers, end users, etc.) collecting data of energy consumption and calculate carbon emissions from building operations. There are three methods: top-down, bottom-up and mixed. Top-down method: where GHG emissions reports are required at a regional or national level, estimated performance data for subsets or total building stock can be developed and coupled with estimates of building stock characterized by age, building type, gross floor area, and occupancy (if available); Bottom-up method: Each user obtains measured data on GHG emissions for statistically representative samples of building types. These data may be readily accessible through utility and/or fuel providers. He also introduced the results of a study to show some energy consumption data in different types of buildings in UK and other countries. The energy index is normalized by degree days in the most recent pilot of the CCM. The data input to the tool can either be measured, or calculated or estimated, however according to the result, it is interesting that most of the

data are based on measurements from actual consumption, which means that it is possible to conduct the measurement in buildings (even in developed countries where building level data can be collected).

As a follow up presentation, Mr. Jens Laustsen from the Global Buildings Performance Network (GBPN) introduced the application of CCM to support NAMA in several developing countries. GBPN has developed a template to help countries collect annual data to understand the energy consumption in building sectors. This will also help to define the baseline emissions (BAU emissions) in development of future scenarios for NAMAs.

**Session 5: Urban CDM Approach to the development of a Low-Carbon Livable City**

Dr. Hyun-Woo LEE of the Korea Environment Institute presented the challenges of data complexity for the building sector, e.g. levels of aggregation, key indicators at national level, key indicators at sub sector level, aggregated building data, groups of building, limitations in data availability and quality of data. The presentation also took case studies which showed practices of both approaches (bottom-up and top-down) in countries like India, Indonesia etc. It also showed how the data could be utilized while formulating National/Sectoral Policies (NAMAs).

It was also highlighted that urban CDM projects are just less than 1% of the total registered CDM projects; issuance of CERs is just around 0.2%. This is due to various reasons: complicated administrative procedures, complicated methodologies and limited emission reduction performance leading to less attractive revenues. The proposed solutions could be: automatic additionality, allowing financial aids in the investment analysis, leniency in demonstrating common practice analysis, allowing systematic MRV, use of multiples technologies in a PoA and providing default baseline scenarios.

Lastly, Dr. Lee presented an analysis of a “tool kit” designed to promote emission reduction projects at the city level. The analysis looks at several CDM/PoA methodologies and recommends simplification of existing requirements, such as additionality demonstration and data collection for monitoring.

Professor Kwi-Gon KIM presented the Urban Environmental Accords (UEA) model, which has provisions for finance coming from commercial banks as well as direct benefits given back to the residents. The UEA approach is very comprehensive and includes monitoring at each household, mainly electricity, gas and water consumption. The purpose of monitoring water consumption is to have an estimate of the energy input required to deliver that amount of water (i.e. purification, distribution, pumping, etc.). There was a suggestion from the group (Oxford Brookes) to include monitoring of temperature as well, especially taking into account that prices for temperature sensors and transmission data have dropped significantly in recent years.

**Session 6: UNEP Urban CDM Handbook**

In this session, the draft publication of ***UNEP Handbook_Urban Carbon Mechanisms*** was briefly introduced and discussed. Mr. Stephane Pouffary, ENERGIES 2050 highlighted that every city is unique, so is the possible way of standardization for mitigation. Mr. Pouffary also emphasized the important engagement of urban authorities in national GHG discussions. A question asked during the discussion was can PoAs provide the flexibility needed for cities?

Some members of the round table expressed concerns about the process to building consensus with regard to the content of the handbook, especially considering that the different approaches on the table were not very compatible to one another. Representatives from UNEP as well as Energies 2050 clarified that the handbook is a collection of methodologies and case studies, which will be made available to policy makers. That means that there won't be any prescription of a particular approach as being the ultimate solution. The representative from Oxford Brookes stressed the fact that based on ongoing research (i.e. cities that he's visited in the UK), local governments are keener to accept an approach where GHG reduction is one of the many outcomes of any action being implemented. In other words, projects at the city level should be driven by a range of other factors, such as sustainability, crime control, resilience and adaptation to adverse weather, etc. Furthermore, it was highlighted that, as a selling point, the handbook should emphasize co-benefits like employment, health improvement, etc. Lastly, the handbook should include a section on scalability and replicability. The representative from ICLEI mentioned that case studies included in the handbook should highlight the context of the host city, in terms of geographical location and economic conditions. All attendees were offered the opportunity to peer review the draft handbook.

**Session 7: Conclusion and way forward**

This session discussed possible improvement of existing CDM methodologies or proposals for new methodologies relevant to the urban context:

- The topic on automatic additionality was discussed. The secretariat enquired whether there already is available literature based on which the concept of automatic additionality could be further built upon/referred to. It was suggested that additionality should not be linked with the building code;
- The issue about sample size and the difficulties of surveys were highlighted;
- A preliminary concept for potential water savings in cities was explored;
- Uncertainties of the Modelling Approach was stressed, and it was recommended to develop a separate document for modeling correction factor within methodologies;
- It was mutually agreed that there was a need for a process whereby frequent interactions between practitioners is feasible.