CLEAN DEVELOPMENT MECHANISM

CDM-MP74-A01

Information note

Draft framework for the development of a tool or guidelines to determine standardized baselines (SBLs) for energy efficiency in residential, commercial and institutional buildings

Version 01.0

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Board, at its 82nd meeting, agreed on the development of the standardized baselines framework including the following two different products:

   (a) Product 5: Concept note for the development of two standards with a methodological framework for two specific project types/sectors;

   (b) Product 6: Two standards with a methodological framework for two specific project types/sectors.

2. At its 85th meeting, the Board approved the development of standards with a methodological framework for two specific project types i.e. energy-efficient appliances for residential/household application (e.g. air conditioners, refrigerators) and energy efficiency in buildings.

3. At its 88th meeting, the Board agreed to focus on the development of standards with a methodological framework for specific project types and sectors and requested the MP, in consultation with the SSC WG, to identify potential project types and sectors for further work, for consideration by the Board at a future meeting, instead of working under the "Guidelines for establishment of sector specific standardized baseline".

4. The Meth Panel at its 73rd meeting and the Small Scale Working Group at its 54th meeting jointly discussed an information note prepared by the Secretariat indicating which are the potential areas that could be standardized under a standardized baseline (such as common fixed and monitoring parameters and approaches) and which are the gaps that could be filled.

2. Purpose

5. The purpose of this call for public inputs is to invite stakeholders to provide their inputs on this draft framework, consisting of elements to develop guidelines or tool that allows DNAs to determine standardized baselines (SBLs) for energy efficiency in residential, commercial and institutional buildings.

6. The public inputs will be taken into account when preparing the draft guidelines or tool to be recommended to the Board at a future meeting.

3. Key issues and proposed solutions

7. N/A

4. Impacts

8. N/A

5. Subsequent work and timelines

9. The comments received during the call for public inputs will be taken into account for the development of draft new guidelines or tool to determine standardized baselines for energy efficiency in residential, commercial and institutional buildings, which will broaden the applicability of the CDM.

10. The secretariat will present the draft new guidelines or tool to the MP.

6. Recommendations to the Board

11. Not applicable (call for public inputs).

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1. Procedural background

1. The objective of this document is to propose elements to develop a tool or guideline containing different approaches to determine the standardized baseline (SBL) of buildings, i.e. the specific energy consumption of different types of residential, commercial and institutional buildings, based on building codes, existing CDM standards and methodologies and green building certification programs.

2. The rationale on each of the proposed requirements to this new tool or guideline is presented in the respective paragraphs below.

2. Purpose and Scope

3. The SBL is applicable to determine the baseline specific energy consumption in residential, commercial and institutional buildings. The proposed different categories of residential, commercial, and/or institutional building units are indicated below – this categorization is not mandatory and the DNAs are invited to define their own categories:

    (a) **Residential building units** - building units used for one of the following dwelling purposes:

        (i) **Single-family (low-rise or high-rise**) - this category includes constructions for a single family or household, such as bungalows, cottages, stand-alone houses, semi-detached houses, town houses and row houses;

        (ii) **Multi-family (low-rise or high-rise)** - this category includes apartments in a building that comprises of more than two apartments;

    (b) **Commercial building units** - building units used for one of the following activities focusing on the exchange of goods and/or services for a profit:

        (i) **Office (low-rise or high-rise**) - this category includes, for example, administrative and professional offices, government offices, and banks or other financial institutions;

        (ii) **Hotel (low-rise or high-rise)** - this category includes, for example, hotels, motels, and guest houses;

        (iii) **Warehouse & storage (low-rise or high-rise)** - this category includes, for example, distribution and shipping centers;

        (iv) **Mercantile & service (low-rise or high-rise)** - this category includes the following:

            a. **Retail** - this category includes, for example, shopping stores for furniture, cloths, drugs, books, or building supplies, rental centers for videos or vehicles, dealer shops or showrooms for vehicles, and studios or galleries;

b. **Food sales** - this category includes, for example, grocery stores or food markets, gas stations with convenience stores, convenience stores, and beer, wine, liquor stores;

c. **Service** - this category includes, for example, auto repair shops, post offices, photocopy center, beauty parlour or barber shop, gas stations without convenience stores, cleaning, and tanning salon;

d. **Other mercantile & service** - this category includes mercantile & service building units that belong to none of the above categories:

i. **Food service (low-rise or high-rise)** - this category includes, for example, restaurants or cafeterias, fast foods, bars, reception halls, and catering services;

ii. **Entertainment (low-rise or high-rise)** - this category includes, for example, cinemas, sports arenas, casinos, and night clubs;

(c) **Institutional building units** -building units used for one of the following activities focusing on not-for-profit services in the public's interest:

(i) **Education (low-rise or high-rise)** - this category includes, for example, preschools or day-care centers, elementary or middle schools, colleges or universities, adult education, career or vocational training, and religious education;

(ii) **Health care (low-rise or high-rise)** - this category includes the following:

a. **Health care** - this category includes, for example, hospitals, clinics, and rehabilitation centers;

b. **Nursing** - this category includes, for example, nursing homes, assisted living centers, or other residential care buildings;

c. **Other health care** - this category includes health care building units that belong to none of the above categories;

(iii) **Public assembly (low-rise or high-rise)** - this category includes the following:

a. **Social or meeting** - this category includes, for example, community centers, lodges, meeting halls, convention centers, senior centers, student activities centers, and parliamentary buildings;

b. **Culture** - this category includes, for example, museums, theaters, operas, and concert halls;

c. **Religious worship** - this category includes, for example, temples, mosques, and churches;

d. **Recreation** - this category includes, for example, gymnasiums, indoor swimming pools, buildings to serve outdoor recreational facilities and outdoor swimming pools;

e. **Other public assembly** - this category includes public assembly building units that belong to none of the above categories:

i. **Public order and safety (low-rise or high-rise)** - this category includes the following:

- **Stations** - this category includes, for example, police and fire stations, other public service stations for road and park maintenance, civil defence;
- **Prisons** - this category includes, for example, jails, reformatories, and penitentiaries;
- **Judiciary** - this category includes, for example, courthouses and probation offices;
- **Other public order and safety** - this category includes public order and safety building units that belong to none of the above categories;
- **Institutional lodging (low-rise or high-rise)** - this category includes, for example, retirement homes, convent or monastery, shelters, orphanage, or children's homes, halfway houses, and military barracks.

Rationale 1: AM0091, EDGE[1] and the CCM[2] divide residential buildings in two different types: single-family and multi-family, where AM0091 provides the detailed above description of the different types of residential buildings.

Rationale 2: this definition of commercial and institutional buildings was sourced from AM0091, since EDGE divides the building types only in residential, hotels, retails, offices and hospitals, and the CCM does not contain any type of sub-division.

4. The geographical scope of the SBL is determined by the DNA. When doing so, the DNA has to take into account the climate zones and other conditions, such as the buildings from the different social-economic levels and rural zones. If the area within the geographical scope has buildings of two or more different social-economic conditions, this area shall be further divided into sub-areas with the same social-economic conditions. The DNAs may decide on their own criterion to define the different social-economic categories or may use the sources below[3]:

[1] EDGE (Excellence in Design for Greater Efficiency – available at <http://www.edgebuildings.com>) is a certification system developed by the IFC (International Finance Corporation). This system includes an online software that determines the baseline specific energy consumption of different types of buildings based climatic conditions, building type and use (occupancy), design and specifications and building orientation and also determines the potential energy savings of different types of measures.

[2] CCM (Common Carbon Metrics – available at <http://ccmbuildings.net/>) is a tool developed by UN Environment and is used for measuring building energy related greenhouse gas (GHG) emissions and energy savings potential of the stock of new and existing buildings in an investment portfolio, municipality, region or country.

[3] Based on paragraph 32(e)(i) of AM0091.

(a) income level information collected from surveys;

(b) government records on income levels (e.g. for tax purposes);

(c) relevant studies or publications on income levels; and/or

(d) property prices per square metre as a proxy for income levels.

Rationale: this requirement provides flexibility to the DNA to define the geographical scope.

5. The SBL shall be determined separately for new buildings and/or retrofit of existing buildings. New buildings are those that have not yet started construction and existing buildings are those that have finalized the construction.

3. Determination of the specific energy consumption in buildings

6. The options below can be used to determine the specific energy consumption of buildings:

(a) Building codes;

(b) Survey with a sample of buildings;

(c) Green building certification programs.

3.1. Building codes

7. This option is applicable if the country or region has a building code in place and if the code indicates which are the consumption elements that are covered. For consumption elements not covered, other options can be applied or simulation can be conducted.

3.2. Survey with a sample of buildings

8. This approach is applicable to both new and retrofitting of existing buildings, and the following approaches can be applied:

3.2.1. Benchmark using the top-20% best performing buildings

9. Under this approach, a survey is conducted with a group of similar building units. Similar building units are defined as:

(a) Buildings that fall under the same category (under the list of paragraph 3 above or defined by the DNA); and

(b) Units that are located in the same geographical scope of the SBL (including climatic zones and social-economic conditions); and

(c) For new buildings, the survey shall be conducted with buildings that were constructed over the last 5 years; for existing buildings, the survey shall be conducted with buildings that were constructed more than 5 years ago.

10. The sample size can be determined:

(a) Following equation 1 from AM0091, where the ratio between the expected population standard deviation and the expected population mean can be derived from officially published documents or own non-representative survey; or

(b) Based on the standard "Sampling and surveys for CDM project activities and programme of activities".

Rationale: this requirement provides flexibility to the DNA on determining the sample size.

11. The specific energy consumption of each building unit (new or existing) under building category *i* included in the sample during year *y* is determined by dividing the electricity consumed and the fuel consumed (both measured directly) by the gross floor area.

12. The next step is to sort the baseline building units in the sample, from the lowest to the highest specific energy consumption (*SEC*) and identify which are the top 20 per cent best performing building units under the building category *i* as the building units with the *1st* to *Jth* lowest SEC, where *J* (the total number of top 20 per cent performer building units *j*) is calculated as the product of the number of baseline building units included in the sample and 20 per cent, rounded down to the next integer if it is decimal.

13. The specific energy consumption of the top 20 per cent performer building units under the building category *i* ($SEC_{Top20\%,i,j,y}$) is averaged to determine the top 20 per cent specific energy consumption benchmark for building units in year *y* ($SEC_{Top20\%,i,y}$).

$$SEC_{Top20\%,i,y} = \frac{\sum_{i}^{j} SEC_{Top20\%,i,j,y}}{J_{i,y}} \quad \text{Equation (1)}$$

Where:

$SEC_{Top20\%,i,y}$	=	Specific energy consumption of the top 20 per cent performer residential buildings category *i* in year *y* (kWh/(m^2.yr))
$SEC_{Top20\%,i,j,y}$	=	Specific energy consumption of top 20 per cent best performer building unit *j* under building category *i* in year *y* (kWh/(m^2.yr))
$J_{i,y}$	=	Total number of the top 20 per cent performer building units in building unit category *i* belonging the sample[4]

Rationale: paragraphs 18 to 20 were sourced from AM0091.

3.2.2. Benchmark based on the lower bound of the 95% confidence level

14. Under this approach, a survey is conducted with a group of similar units. The definition of similar units are indicated in paragraph 9 above.

15. The sample size is determined through paragraph 10 above.

16. The benchmark is determined based on the lower bound of the 95% confidence level.

[4] This parameter is calculated as the product of the total number of building units in the sample and 20 per cent, rounded down to the next integer if it is decimal.

Rationale: this option follows the classic statistical approach. The advantage of this option against the top-20% benchmark is that the weighted average of the sample provides the proper weight of situations where the consumption of the building determined for a certain year is low because it was partially used during this certain year. For example, a building belonging to the sample and occupied for 10% of the year would result in a low specific consumption and would likely going to fall under the top-20% (although the low consumption was not due to the energy efficiency measures), whereas the use of the average takes into account the consumption of the other units belonging to the sample (both low-and-high consuming building).

3.3. Green Building certification programs

17. Under this option, the DNA may rely on information from national/regional/international green building certification programs (e.g. EDGE) in order to derive the standardized baseline. In doing so, relevant evidences and justifications supporting the submissions of the standardized baselines should be provided by the DNA.

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Document information

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