Methodology for climate accounting of energy efficiency projects in buildings (EEB)

1. Scope

Projects for the renovation or construction of buildings (residential, educational, health, industrial, cultural, commercial, office, transport, etc.), for which an objective of improving energy and environmental performance compared to the reference situation is stated.

2. Mitigation

2.1. Eligibility of EEB projects for mitigation

A project is eligible:

- if it includes a study to improve the energy and environmental performance compared to the baseline situation. This study must consider in its calculations of the building's performance the projected temperatures at 2050;
- for new construction projects, if it aims for reductions of at least 20% in GHG emissions compared to the reference scenario, 20% in energy consumption and/or 20% in water consumption (2 of the 3 conditions are sufficient).

In addition, since energy efficiency includes not only active measures related to equipment (including RES), but also passive measures related to the design and envelope of the building, its location, and management and user awareness measures promoting energy sobriety, eligible new construction projects must:

- reflect a bioclimatic design effort (favor in particular the insulation of roofs valid for any climate and natural ventilation when it is justified by outdoor temperatures) and study the conditions for the implementation of constructive methods that promote local know-how and materials;
- in urban areas, to fit into densely developed urban forms or contribute to their densification (if the project incorporates a solar thermal or photovoltaic component, the project can be inserted into intermediate urban forms).

Point of attention: If at the time of granting, the study to improve the energy and environmental performance compared to the baseline situation is not initiated or finalized, the Project Note will clearly explain the objective of improving the energy performance targeted (in percentage) and will condition the first disbursement of work on the completion of this study and the integration of the energy efficiency measures recommended in the ODA.

2.2. Quantification of mitigation impacts

- GHG emission reductions are expressed as follows:
  - In % of the annual GHG emissions of the reference building.
  - In tonnes of CO2eq avoided annually. These can be less than 10KtCO2eq/year.

- The calculation can be carried out with AFD's carbon footprint tool or other available tools such as EDGE software or dynamic thermal simulation software such as Energy Plus, TRNSYS, Virtual Environment, ...

- The calculation includes at least scopes 1 and 2, as well as scope 3 when it is significant (for example, the grey energy to produce building materials).

- The baseline scenario is defined as follows:

  - Renovation: the existing building, before renovation. In the case of a renovation/extension, the extension part is treated as a new building.
  - New construction:
    - where thermal regulations exist and are applied by the majority of builders in the country of the project, the reference situation corresponds to the consumption of the same building constructed in accordance with that regulation;
    - otherwise, the building projected in the APS or ODA if these studies have already been carried out at the time of the AFD financing instruction, or a recent counterfactual building, of the same type (use, surface) or a theoretical counterfactual building (e.g. EDGE).

2.3. Climate accounting for mitigation

Eligible expenditure

The eligible expenses for the valorization of the climate co-benefit under mitigation are:

- **for renovation projects** (similar scope to the World Bank and IFC):
  - Engineering costs related to energy improvement.
  - Costs of work (labor, materials, equipment) to improve the energy performance and thermal comfort of the building (walls, roofs, low floors, windows and other exterior openings), efficient systems (ventilation, air conditioning, domestic hot water production, heating, lighting, engines) and the production of renewable energies (solar thermal, photovoltaic, geothermal, etc.).
  - Technical assistance associated with the project.

- **for new construction projects:** the value of the project minus the cost of land and the costs of supplies and equipment specific to the use of the building (similar scope to the World Bank and IFC).

This definition of eligible expenditure makes it possible to take into account in the climate qualification only expenditure relating to the construction of the building and the energy

systems necessary for its operation. Anything that is not directly associated such as land or specific equipment is not counted.

Allocation of percentages of co-benefit for mitigation

Renovation projects are awarded a co-benefit of 100% of eligible expenditure.

New construction projects are accounted for at a flat rate up to 40% of eligible expenditure.

This percentage may be increased by:

- +10% if the building uses "low carbon" building materials (alternatives to cement, steel or glass, etc.), i.e. justifying a significant reduction in emissions for their production or if certification to TB, G or Silver levels is targeted.[1]
- +30% when projects justify a GHG saving of more than 40%.

3. Adaptation

3.1. Eligibility of EEB projects under adaptation

Eligibility is determined in three stages in accordance with the IDFC-MDB common principles: [2]

- Existence of climate vulnerability.
- Explicit objective of the project to address this vulnerability
- Existence of an investment in the project related to this objective.

In particular:

- The attribution of a climate co-benefit for adaptation implies that the resilience of the building to the effects of climate change is an objective to be achieved, explicitly discussed and shared with the project owner.
- The project must include a study to improve energy and environmental performance including a simulation of the impact of the projected temperatures at 2050 on the comfort of the building.

3.2. Quantification of adaptation impacts

Taking into account the effect of climate change on the calculation of energy performance must lead to design choices and equipment to maintain the comfort of the occupants (thermal comfort and indoor air quality) in periods of high heat without increasing energy consumption and expenditure: the operating temperature (average between the dry temperature and the surface temperature of the walls) must as much as possible remain indoors. of the comfort diagram. In hot and dry climates the ASHRAE 55 adaptive comfort standard will be used. In hot and humid climates the GIVONI diagram will be used.

---

[1] Certification: one certification process of Buildings (HQE, LEED, BREEAM, EDGE, etc.) on Levels at least "very good – TB for HQE", "good – G for BREEAM", "Silver for LEED", etc. east Recommended.

[2] https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Common_Principles_for_Climate_Change_Adaptation_Finance_Tracking_-_Version_1__02_July__2015.pdf

The use of local eco-materials and/or traditional construction methods is recommended when it allows in particular the improvement of thermal comfort.

When in its design or use the project does not integrate an air conditioning or heating system or integrates only a partial system (presence of non-air-conditioned premises), it will be necessary to use a duly referenced dynamic thermal simulation tool (STD) (TRNSYS, IES-VE, Design Builder, ...) to simulate the resilience of the proposed measures. Indeed, in the EDGE tool air conditioning is not an option but a systematic use.

The design of the building must address other climate risks relevant to the project (droughts, cyclones, heavy rains, sea level rise, etc.). Thus:

- in a dry geographical area subject to water stress, a project should integrate into the feasibility a water-saving management (rainwater collection, economizers, etc.);
- in a geographical area where waste and wastewater treatment infrastructure is vulnerable to climate change (floods, storms, droughts, rising temperatures) which can thus cause health risks (water-borne diseases in particular) and environmental degradation (loss of ecosystems), the project should integrate climate risk management into feasibility in order to make wastewater and wastewater treatment operational. rubbish.

The baseline scenario is defined as follows:

- Renovation: the existing building, before renovation. In the case of a renovation/extension, the extension part is treated as a new building.
- New construction: the construction standards in force if they exist, otherwise, the building proposed in the APS or the DPA if these studies have already been carried out at the time of the afd financing instruction or a recent existing counterfactual building of the same type (use, surface) or a theoretical counterfactual building.

3.3. Climate accounting for adaptation

Eligible expenditure
The eligible expenses for the valorization of the climate co-benefit for adaptation are:

- **for renovation projects:**
  - Engineering costs related to the design of the renovation project and adaptation measures.
  - Costs of adaptation measures (labour, materials, equipment).
  - Technical assistance associated with the project.

- **for new construction projects:** the value of the project less the cost of land and the costs of supplies and equipment specific to the use of the building.

Allocation of climate co-benefit percentages for adaptation

Renovation projects are awarded a co-benefit of 100% of eligible expenditure.

Eligible new construction projects are accounted for on a flat-rate basis:

(1) For any type of building, the sum of the percentages corresponding to the measures actually adopted shall be recorded in accordance with the following table:

Measurements	% Adaptation
1) Improvement in thermal comfort of 20% based on future temperatures (projected at least over 20 years) compared to the reference project	+15%
2) Water savings of 20% compared to the reference project	+15%
3) Taking into account climate risks in the target areas: > Sea level rise. > Floods or drought or land movements > Cyclones.	+15% per risk taken into account

3) For buildings with low energy intensity (schools, health clinics and housing in rural areas) for the sake of simplicity, a flat-rate accounting of 40% is allowed as soon as the relevant risks are taken into account (a higher accounting remains possible by applying the % of the table given in 1/ if the number of risks taken into account justifies it).

Examples:

E1. Energy-intensive building

A hospital project with a total cost of €100 million, of which €20 million concerns land and specific equipment. The study to improve energy and environmental performance shows that:

- the emissions of this hospital are reduced by 25% per year compared to a hospital built 2 years ago in the same country; and

- that this performance will continue over the next 30 years, even in a warmer climate of +2°C.

The percentage of climate co-benefit for mitigation is 40% of eligible expenditure. The net percentage of climate co-benefit for the mitigation component is (100-20)*40%/100 = 32%.

The design of the hospital taken as an example takes into account the rise in temperatures of 2°C by 2050. It improves the thermal comfort of staff and patients by 20% compared to the reference project without increasing energy consumption. To achieve this result, the building uses, for example, natural ventilation in spaces that are not subject to set temperatures (such as operating theatres for example). In addition, the hospital project includes in its design facilities and equipment to reduce water consumption by 20% compared to the reference project.

The percentage of co-benefit granted for adaptation is:

15% for thermal comfort + 15% for water saving = 30%. The corresponding net percentage is (100-20)* 30%/100 = 24%.

In total, the net climate co-benefit (mitigation + adaptation) is 56%.

E2. Energy-intensive building with certification process

The E2 project uses the same characteristics of use, cost and energy performance as project 1. However, E2 is implemented as part of a certification process. It is granted the following:

- 40% (flat-rate) + 10% (certification) for mitigation, i.e. a net climate co-benefit of (100-20)*50%/100 = 40%;

- 40% flat rate for adaptation, i.e. a net climate co-benefit of 32%.

In total, the net climate co-benefit (mitigation + adaptation) is 72%.

E3: Low-energy buildings

The project consists of a programme to build 100 primary schools in rural areas. Project amount €60 million. Amount of eligible costs €55 million.

The project incorporates a bioclimatic design that improves thermal comfort by 25% compared to the reference project. This result takes into account projected temperatures at 2050. The construction method incorporates local eco-materials (mud brick). The energy-consuming equipment (mainly lighting and air conditioning units in the areas reserved for administration) is optimised and allows a saving of 30% compared to the reference building. The project also incorporates optimised water management. The study on climatic phenomena in the project country does not identify any other climate risk than that of the temperature rise of + 2°C by 2050 and water stress.

The percentage of climate co-benefit granted for mitigation is: 40% (flat rate) + 10% (due to the use of eco-materials) = 50% of eligible costs, i.e. a percentage of net co-benefit of (55*50%/60) = 46%.

The climate co-benefit for adaptation is 40% of the eligible costs, i.e. a net co-benefit of 37%. In total, the net climate co-benefit (mitigation + adaptation) of this project is 83%.