Frequently Asked Questions (FAQs)

FAQ 9.1 | To which GHG emissions do buildings contribute?

There are three categories of GHG emissions from buildings:

i. direct emissions which are defined as all on-site fossil fuel or biomass-based combustion activities (i.e., use of biomass for cooking, or gas for heating and hot water) and F-gas emissions (i.e., use of heating and cooling systems, aerosols, fire extinguishers, soundproof);
ii. indirect emissions which occur off-site and are related to heat and electricity production; and
iii. embodied emissions which are related to extracting, producing, transforming, transporting, and installing the construction material and goods used in buildings.

In 2019, global GHG emissions from buildings were at 12 $GtCO_2$-eq out of which 24% were direct emissions, 57% were indirect emissions, and 18% were embodied emissions. More than 95% of emissions from buildings were CO_2 emissions, CH_4 and N_2O represented 0.08% each and emissions from halocarbon contributed by 3% to global GHG emissions from buildings.

FAQ 9.2 | What are the co-benefits and trade-offs of mitigation actions in buildings?

Mitigation actions in buildings generate multiple co-benefits (e.g., health benefits due to the improved indoor and outdoor conditions, productivity gains in non-residential buildings, creation of new jobs particularly at local level, improvements in social well-being etc.) beyond their direct impact on reducing energy consumption and GHG emissions. Most studies agree that the value of these multiple benefits is greater than the value of energy savings and their inclusion in economic evaluation of mitigation actions may improve substantially their cost-effectiveness. It is also worth mentioning that in several cases the buildings sector is characterised by strong rebound effects, which could be considered as a co-benefit in cases where the mechanisms involved provide faster access to affordable energy but also a trade-off in cases where the external costs of increased energy consumption exceed the welfare benefits of the increased energy service consumption, thus lowering the economic performance of mitigation actions. The magnitude of these co-benefits and trade-offs are characterised by several uncertainties, which may be even higher in the future as mitigation actions will be implemented in a changing climate, with changing building operation style and occupant behaviour. Mitigation measures influence the degree of vulnerability of buildings to future climate change. For instance, temperature rise can increase energy consumption, which may lead to higher GHG emissions. Also, sea level rise, increased storms and rainfall under future climate may impact building structure, materials and components, resulting in increased energy consumption and household expenditure from producing and installing new components and making renovations. Well-planned energy efficiency, sufficiency and on-site renewable energy production can help to increase building resilience to climate change impacts and reduce adaptation needs.

FAQ 9.3 | Which are the most effective policies and measures to decarbonise the building sector?

Several barriers (information, financing, markets, behavioural, etc.) still prevents the decarbonisation of buildings stock, despite the several co-benefits, including large energy savings. Solutions include investments in technological solutions (e.g., insulation, efficient equipment, and low-carbon energies and renewable energies) and lifestyle changes. In addition, the concept of sufficiency is suggested to be promoted and implemented through policies and information, as technological solutions will be not enough to decarbonise the building sector. Due to the different types of buildings, occupants, and development stage there is not a single policy, which alone will reach the building decarbonisation target. A range of policy instruments ranging from regulatory measures such as building energy code for NZEBs and appliance standards, to market-based instruments (carbon tax, personal carbon allowance, renewable portfolio standards, etc.) and information. Financing (grants, loans, performance base incentives, pays as you save, etc.) is another key enabler for energy efficiency technologies and on-site renewables. Finally, effective governance and strong institutional capacity are key to have an effective and successful implementation of policies and financing.